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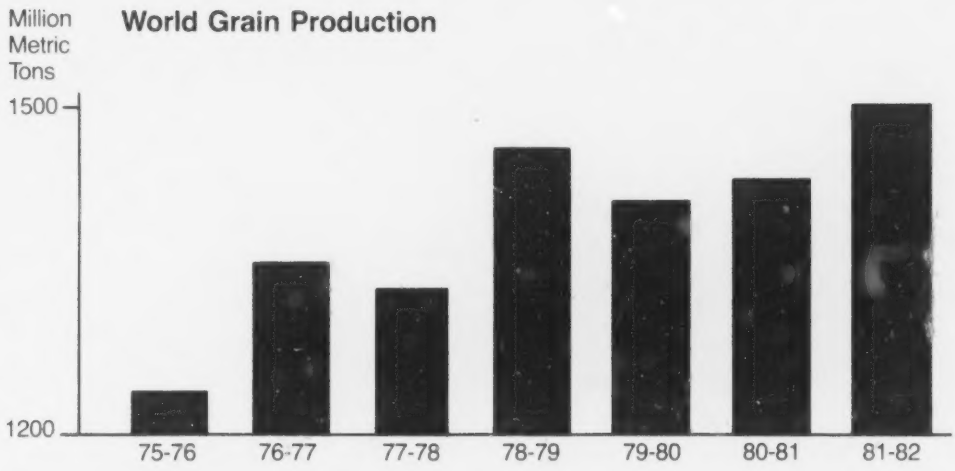
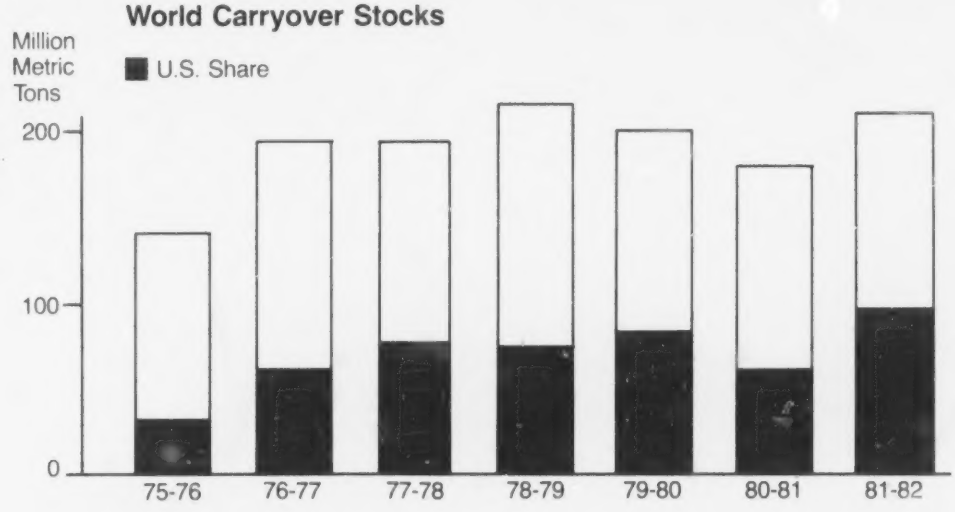
World Food Trade and U.S. Agriculture, 1960-1981





August 1982
Second Annual Edition

THE WORLD FOOD INSTITUTE
Iowa State University
Ames, Iowa

Abstract

World grain production continued its long-term upward trend in 1981-82. However, growth of global trade has slowed dramatically as a result of widespread economic recessions and large debt accumulations in Eastern Europe and many developing nations. Global grain stocks are rising in 1981-82 but are a much smaller percentage of annual utilization than two decades ago.

Large foreign crops and sluggish demand brought a sharp decline in the U.S. share of world coarse grain exports in 1981-82. However, the U.S. share of world trade in wheat and soybeans continued to expand. Despite the slower growth of world trade, U.S. farm product exports remain vitally important to American agriculture and provide foreign exchange earnings to pay for imported petroleum and other products.

Emerging issues in trade policy include (1) protectionism, (2) use of agricultural trade for political purposes, (3) methods of maintaining adequate global food reserves, (4) impacts from long-term bilateral trade agreements and (5) policy actions needed to promote stable economic growth and encourage trade.

Key words:
Grain, oilseeds, corn, soybeans, wheat, agricultural exports, global food, world agricultural trade, U.S. trade, trade policies, U.S. trade shares, agricultural imports, Soviet grain imports, grain embargo

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Foreword

The World Food Institute of Iowa State University was established in 1972 by the Iowa Board of Regents to focus the university's "competencies and leadership upon the provision of adequate and nutritious food supplies for the world's peoples through research and education." Two of the objectives of the institute are (a) to collect, analyze and disseminate information bearing on food and nutrition problems, and (b) to study interrelationships between the United States (with particular emphasis on Iowa) and other countries of the world. In 1980, the Faculty Policy Committee of the World Food Institute recommended that an annual report be published to disseminate information on the role of U.S. agriculture in providing food and feed grains for international trade. The first report was released in October 1981.

World Food Trade and U.S. Agriculture, 1960-1981 is the second annual report analyzing trends for U.S. agricultural products in international markets. For 12 consecutive years, including 1980-81, the dollar value of U.S. farm products exported set new records. Without these large exports, the nation would have had an enormous deficit in net foreign trade. However, because of a widespread economic recession, the world's demand for U.S. feed grains declined in 1981-82; therefore, stocks have risen, predominantly in the U.S., and predominantly as coarse grains. The authors of this report note that agricultural commodities not only have provided food for people but also have generated many nonfarming jobs in industries that supply farmers with seeds, machinery, fertilizers, etc., and in industries that process, transport, finance, market and insure the produce from farms.

The authors, Robert Wisner and Massoud Denbaly, have included long-term trends in global harvested grain and oilseed areas and yields, world livestock production and U.S. meat exports in addition to updating the trends in yields and trade for food and feed grains that were examined in the first annual report in this series. They have identified areas where demand for U.S. farm exports has declined recently and examined reasons for the change. Long-term effects of more restrictive versus less restrictive trade policies are discussed, as well as the economic consequences of using agricultural trade as a diplomatic tool. The impact of an increased number of long-term trade agreements, the importance of stable economic growth for expanding trade, the need for appropriate strategies to provide adequate grain reserves, the ways to finance food imports in developing nations, and the continuing need for investment in education and research to increase the productivity of agriculture around the world. Some of these policy issues will be expanded in subsequent reports which will also update and reexamine the trends in world food trade, particularly with respect to their influences on the U.S. agricultural sector.

The World Food Institute hopes that the analysis of world food trade patterns presented in this second annual report will help readers to gain a better understanding of the complex interrelationships among food-exporting and food-importing countries. We appreciate the efforts that Dr. Wisner and Mr. Denbaly, Department of Economics, have made to reduce large amounts of data to understandable graphs and tables and to identify the significant trends that have occurred, as well as the factors that have influenced them.

Charlotte E. Roderuck
Director, World Food Institute
Iowa State University

Summary and Implications

World grain production continued its long-term upward trend in 1981-82, with production of wheat and coarse grains setting new records. With global demand growth slowed by a widespread economic recession, world grain stocks are rising in 1981-82. However, global stocks as a percentage of annual utilization remain well below the level of 11 or 12 years ago and are sharply below levels of the early 1960's. Most of the current buildup of stocks is occurring in the U.S. and is concentrated heavily in coarse grains. Thus, in mid-1982, short-term world supplies of grain and other agricultural products appear fully adequate.

World grain trade in 1981-82 increased much more slowly than in the past decade, with a decline in rice and coarse grain exports being offset by increased wheat trade. Coarse grain crops were record large in most major foreign exporting nations and generated sharply higher non-U.S. coarse grain exports in the 1981-82 trade year. With increased foreign competition, the U.S. share of world coarse grain exports has declined to an estimated 60 percent in 1981-82, down from 69 percent in the previous season and 71 percent in 1979-80.

Developed economies and many developing nations have experienced significantly increased per capita grain production in the last two decades. In industrial nations, increased grain supplies have been used to increase per capita consumption of livestock and poultry products. However, Sub-Saharan Africa is a major exception to this trend. Rapid population growth in that region and disappointing progress in grain production have reduced per capita grain production there in the last few years.

World livestock inventories are growing more slowly than in the rapid growth period of the 1970's as a result of high unemployment and slower growth of consumer incomes in most major industrial nations. A slower expansion in livestock production has restrained global growth in demand for coarse grains and oilseed meal. Despite slower growth in livestock production, the Soviet Union continues to be a major grain importer, accounting for 22 percent of all world wheat and coarse grain imports in the July-June 1981-82 trade year. Following the 1980-81 partial U.S. embargo on sales of grain to the Soviet Union, the USSR has diversified its sources of grain imports. The U.S. now accounts for slightly over one-third of all Soviet wheat and coarse grain imports, down from 74 percent in 1978-79.

With its immense population, the People's Republic of China (PRC) is a potentially important element in world grain trade. However, near-record 1981-82 PRC grain imports were less than one-third as large as those of the Soviet Union and were concentrated more heavily in wheat than in coarse grains. As a result of the four year U.S.-China grain agreement negotiated in 1980, the U.S. share of Chinese grain imports has risen sharply above previous levels.

Long-term population trends and economic projections point to further growth of world trade in grains, oilseeds and other agricultural products in the 1980's, but at a slower rate than the rapid growth period of the 1970's. The growth rate will be restrained some by a heavy accumulation of debt in Eastern Europe and many developing nations, the recent stronger U.S. dollar in world currency markets and expected slower global economic growth than in the last decade.

Despite slower growth of world demand, exports remain vitally important to U.S. agriculture and the U.S. economy. Foreign markets are a major source of farm income, especially for U.S. grain and oilseed producers. U.S. exports also are a major supplier of foreign exchange earnings to pay for imports essential to the American economy. U.S. agricultural exports in October-September 1981-82 are expected to be the second largest on record, but down slightly from the previous year. The U.S. also is a significant importer of agricultural products, with about one-third of these imports representing products not produced in commercial quantities in the U.S. The nation's farm product exports, however, sharply exceed its agricultural imports and provide a large positive trade balance in farm products. U.S. agricultural imports in the October-September 1981-82 fiscal year are expected to decline slightly for the second consecutive year.

U.S. corn and coarse grain exports have shown the most rapid growth of all overseas sales of American farm products in the last decade. In 1981-82, exports of these products declined for the first time in several years because of sluggish world demand and increased foreign competition. U.S. exports of wheat, soybeans and soybean meal also expanded sharply in the 1970's, with growth in exports of these products continuing into 1981-82. U.S. red meat and meat product exports to major foreign destinations have increased moderately since the mid-1970's. However, U.S. meat exports continue to face major import restrictions in overseas markets, and future trends will depend heavily on world trade policies.

With slower growth in world trade, major exporting nations are attempting to increase their respective shares of world markets and at the same time protect domestic producers from foreign competition. The emerging protectionist mood in world trade includes threatened use of subsidized credit, outright export subsidies and retaliatory trade restrictions as means of gaining an expanded share of world trade. These trade policies run some risk of developing into a short-term trade war with increased trade restrictions, lower world grain prices and no major gain to exporting nations. As trade policies are formulated, long-run benefits from less restrictive trading policies should be recognized.

Other important policy issues include (1) the role and economic effects of using agricultural trade as a diplomatic tool, (2) implications for developing countries and livestock producers from the recently increased use of long-term agreements in international grain trading, (3) stable economic growth as a requirement for expanded trade, (4) appropriate strategies for providing adequate world grain reserves, (5) financing of food imports in developing nations and (6) providing adequate investments in research and education to increase the future productivity of world agriculture.

Introduction

U.S. agricultural trade is of major significance not only to the nation's farmers and ranchers, but also to the U.S. labor force, millions of domestic and foreign consumers and the American economy. In the 1980-81 world trade year, U.S. exports supplied 8 percent of all foreign grain consumption and accounted for 58 percent of the world's combined exports of wheat and coarse grains. Along with large grain exports, foreign markets also are important for U.S. producers of soybeans, cotton, tobacco, fruits, vegetables and animal products. Combined exports of all U.S. agricultural products in 1980-81 were equivalent to 31 percent of U.S. farmers' cash receipts from farm marketings and provided a market for the production of about 1 out of every 3 acres harvested in the U.S.

The contribution of U.S. agricultural exports goes far beyond the added markets and income for the nation's producers and providing of food for a growing world population. These exports generate jobs in the U.S. farm supply industry, in processing, transportation, financing, merchandising, insurance and other areas of work involved in producing and marketing the nation's agricultural abundance. Farm product exports brought $43.8 billion into the U.S. in the 1980-81 fiscal year ending Sept. 30, 1981. Farm export earnings in a very real sense helped to pay for the nation's imports of petroleum, automobiles, electronic goods, textiles and other products purchased from abroad. Without large farm product exports, the U.S. would have experienced a staggering deficit in its net foreign trade. Agricultural exports, by helping to hold down the trade deficit, have supported the value of the U.S. dollar relative to foreign currencies. By supporting the dollar, these exports have helped to hold down costs to U.S. consumers for a wide range of imported products and consequently have assisted in restraining inflationary pressures on products the U.S. buys abroad.

For 12 consecutive years including 1980-81, the dollar value of U.S. farm product exports set new records. However, in the current trade year, exports have declined for the first time in more than a decade. The purpose of this report is to identify the areas where export demand has declined, to point out reasons for the decline and to place the current situation in the perspective of longer-term trends in world food trade. Also identified will be areas where progress is being made in per capita food production, areas where progress has been disappointing and recent financial developments restraining the growth of world food trade. Also included is a long-term look at trends in global harvested grain and oilseed area and yields, world livestock production trends and per capita meat production in major export markets for U.S. farm products.

Trade policy is becoming increasingly important in an environment where unemployment is high, grain stocks are rising and demand for agricultural products is growing more slowly than in recent years. This report points out several emerging issues in agricultural trade policies of the U.S. and other major trading nations and their importance to U.S. agriculture.

The World Food Situation in 1981-82

From the perspective of U.S. farm prices, the world grain situation changed dramatically in the last half of 1981 and early 1982. One major purpose of this report is to identify factors responsible for the severe break in the grain markets. Has the world suddenly moved into a period of permanent and burdensome grain surpluses? Is world trade in grains declining? Have grain stocks risen sharply above the level of recent years? What role have foreign accumulations of debt played in depressing late 1981 and early 1982 U.S. grain prices? This report will attempt to answer these questions and to examine the current world grain and food situation in the context of longer-run economic developments.

Overview of Trade Developments

World food trade in 1981-82 is highlighted by several major developments including (1) record world production of all major grains and near-record production of oilseeds, (2) a business recession in several industrial nations and slowing economic growth rates in others, (3) political tensions, (4) concern over the debt servicing capability of Eastern Europe and (5) strong pressures for protectionist policies in international trade. These developments appear to have impacted more heavily in the U.S. corn (maize) market than in other sectors of world agriculture. U.S. corn exports have fallen sharply below long-run trend lines and well below levels of the previous two years. Reduced exports and sluggish domestic demand are pushing U.S. corn carryover stocks to record or near-record levels. At the same time, exports of other major coarse grain (feed grain) exporting countries have surged ahead, leaving world coarse grain trade only slightly below a year earlier. Total non-U.S. coarse grain carryover stocks appear to be slightly below last season. U.S. and world wheat and soybean exports in 1981-82, in contrast to corn, are expected to be at record or near-record levels although prices have been depressed by large supplies.

An in-depth analysis of world demand suggests that U.S. and world exports of grains and oilseeds will continue to grow in

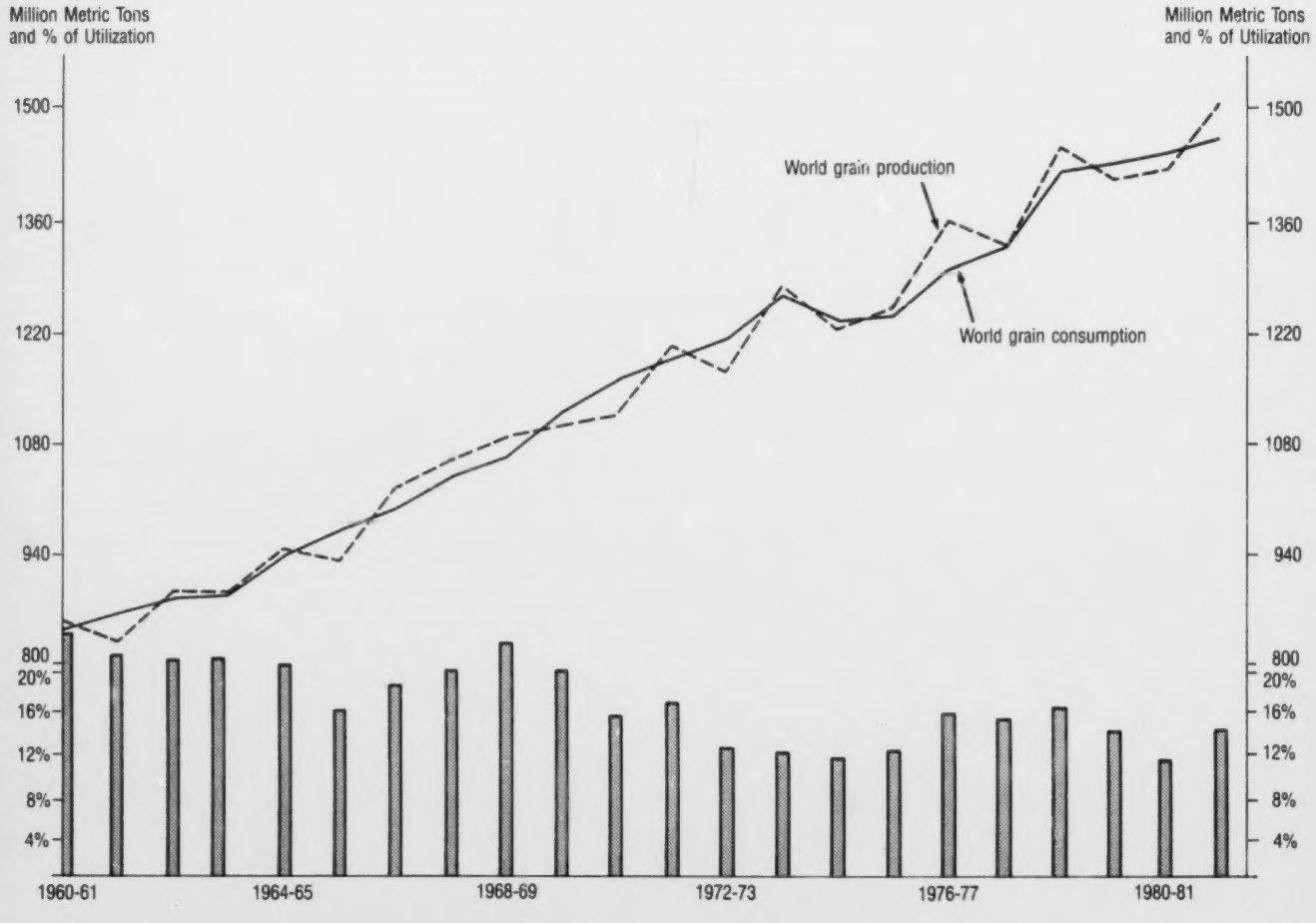


Figure 1. World Grain Production and Consumption in Millions of Metric Tons, and Carryover Stocks as Percentage of Annual Consumption, July-June, 1960-61 to 1981-82.

the years ahead, but probably at a slower rate than the phenomenal growth of the 1970's. Grain prices in the next two or three years will be strongly influenced by world weather patterns, U.S. and foreign monetary policy, and participation in U.S. production control and grain reserve programs. While U.S. grain stocks appear burdensome, world stocks are still only slightly above the level of recent years and represent only a small reserve against widespread adverse weather.

World Grain Supplies, Utilization, Trade and Stocks

Table 1 and Figure 1 show estimates of the world supply-demand situation for all grains in 1981-82 and comparisons with recent years. World grain production in 1981-82 set a new record of 1.5 billion metric tons, up 4.7 percent from the previous July-June trade year and 3.0 percent above the former record three years earlier. From a longer-term view, world grain production this season is estimated to be one-fourth larger than in the early 1970's and 78 percent larger than in 1960-61.

Record world grain production reflects generally favorable growing conditions in 1981 and early 1982 except in the USSR, South Africa and parts of Eastern Europe, record average yields per hectare, and 0.7 percent greater area harvested for grain than in the previous trade year.

World utilization of all grains is expected to be a record 1.49 billion metric tons, 1.2 percent above last season. Utilization at that level represents an absolute annual growth rate about half as large as the average for the decade of the 1970's. Slower growth in utilization reflects the economic recession in industrial nations and a leveling off of livestock numbers in several major grain-feeding nations.

Global grain trade in 1981-82 leveled off at the previous season's record rate. The last year that world grain trade failed to increase substantially was in 1974-75, and world grain trade has declined only seven years out of the past two decades. Thus, the recent slowdown in growth of world grain trade is a marked deviation from the pattern of recent years.

World grain stocks in metric tons are projected to be the highest in three years and are approaching the record 1978-79 level. However, a more meaningful way of looking at world stocks is in months' requirements. When expressed in these terms, world stocks are far from record levels and are less than two months' requirements. Ending world stocks are projected at 14.6 percent of utilization, slightly above a year earlier but below the recent peak of 15.5 percent in 1978-79 and sharply below the level of the 1960's. American grain growers may find low grain prices puzzling with world stocks still representing only a small percentage of annual consumption. The reason for this seeming inconsistency is that most of the stocks buildup in 1981-82 is occurring in the U.S. Moreover, the rise in U.S. stocks is concentrated heavily in corn and has severely affected prices for that crop.

World Wheat Availability, Utilization and Reserves

Table 2 shows world production, utilization, trade and carryover stocks of wheat and comparisons with recent years. World wheat production is estimated at a record 453 million metric tons, 3.2 percent above the previous season and 1.5 percent above the old record in 1978-79.

World utilization of wheat is holding near the record level of the past two seasons. The failure of utilization to increase significantly reflects slower economic growth than in the past decade. After two consecutive years in which production fell short of utilization and stocks were drawn down, world wheat stocks are increasing modestly in 1981-82. However, stocks both in absolute terms and in percentage of annual utilization are well below previous records.

U.S. wheat exports have surged ahead to an all-time record, expanding at a slightly

Table 1. Combined World Supplies, Utilization, Trade and Stocks of All Grains in 1981-82 and Selected Recent Years in Millions of Metric Tons.[a]

July-June Trade Years	Production	Utilization	Trade	Ending Stocks[b]	Stocks as % of Utilization
Est. 1981-82	1,503	1,469	214	214	14.6
1980-81	1,435	1,452	212	180	12.4
1979-80	1,418	1,442	200	196	13.6
1978-79	1,460	1,433	174	220	15.5
1976-77	1,360	1,307	156	193	14.9
1971-72	1,193	1,175	110	183	15.6
1966-67	1,004	978	104	170	17.4
1960-61	845	831	73	198	23.8

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982. Includes wheat, rice and coarse grains.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

Table 2. World Wheat Production, Utilization, Trade and Carryover Stocks in Millions of Metric Tons in 1981-82 and Selected Recent Years.[a]

Trade Years	Production	Utilization	U.S. Exports	Non-U.S. Exports	Total Trade	Ending Stocks[b]	Stocks as % of Utilization
Est. 1981-82	453.4	444.2	48.4	50.3	98.7	84.6	19.0
1980-81	439.4	444.3	41.9	51.9	93.9	75.4	17.0
1979-80	422.5	443.4	37.2	48.9	86.1	80.0	18.0
1978-79	446.6	429.9	32.3	39.7	72.0	100.9	22.6
1976-77	421.2	385.2	25.8	37.3	63.1	98.8	25.7
1971-72	349.3	342.4	16.6	35.4	52.0	81.1	23.7
1966-67	297.0	288.6	20.3	30.7	51.0	90.5	31.4
1960-61	238.3	235.3	19.6	22.4	42.0	79.3	33.7

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982. Includes wheat and wheat products.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

more rapid absolute growth rate than the average of recent years. In the 1981-82 trade year, U.S. wheat exports were nearly triple a decade earlier and nearly 2.5 times as large as in 1960-61. Non-U.S. wheat exports, on the other hand, have declined slightly this season but are above any year prior to 1980-81. Total world trade in wheat and wheat products has continued to rise, but at a considerably slower rate than in the 1970's. Table 3 shows recent trade patterns of major non-U.S. wheat exporters. Wheat shipments from the four major exporters are well above three years earlier but differ only slightly from 1980-81 exports. The decline in non-U.S. wheat exports in 1981-82 is due largely to reductions in the "others" category.

World wheat stocks are expected to be approximately 85 million metric tons at the end of the 1981-82 trade year, 12 percent above last season but well below the recent peak of 101 million tons in 1979. These stocks represent 19 percent of annual consumption, moderately below the 1979 level and sharply below the 1960's through the mid-1970's when stocks ranged from one-third to one-fourth of annual requirements. Thus, despite recent low wheat prices, there has been a long-term downward trend in real reserves of wheat at the world level. The modest increase in world wheat stocks in 1981-1982 is about equally divided between U.S. and non-U.S. holdings.

World Coarse Grain Availability, Utilization and Reserves

World production, utilization, trade and stocks of coarse grain in 1981-82 and comparisons with selected recent years are shown in Table 4. World production is placed at a record 773 million metric tons, 5.9 percent above the reduced 1980 level and 2.6 percent above the old record in 1978-79. World utilization is slightly above the previous season and 0.3 percent above the old record in 1978-79. With continued population growth, world per capita coarse grain consumption remains below the peak of the late 1970's. Exports are running at the second highest level in history but 2 percent below the previous year. The near-record exports reflect sharply higher non-U.S. exports and a 15 percent decline in U.S. exports. With this combination of production and utilization, world feed grain stocks are expected to be nearly one-third higher than in the previous season and only slightly below the 1960-61 level.

In terms of months' utilization, world stocks are slightly above a year earlier but are well below the 1961 level when stocks stood at 25 percent of annual utilization. World stocks as a percent of utilization remain only slightly above the low levels of the 1975-1981 period and still represent a relatively small reserve against widespread adverse weather. In evaluating these reserves from a world food security viewpoint, one should also note that livestock breeding herds represent an additional food reserve in the grain-feeding industry that can be drawn upon temporarily when coarse grain supplies are critically short.

Table 5 shows trends in U.S. and non-U.S. carryover stocks of coarse grains since 1969-70. Non-U.S. carryover stocks in metric tons have remained remarkably stable during the past 12 years but have been trending downward as a percentage of annual consumption. Total non-U.S. stocks during this period ranged from a low of 36.5 million metric tons in 1972-73 to a high of 45.6 million tons four years later—a variation of 9 million tons. Non-U.S. stocks in 1981-82 are down slightly from a year earlier and are slightly below the level of the mid 1970's. U.S. stocks during the same period were much more volatile. Thus, it is apparent that the U.S. has tended to be a residual supplier of coarse grains in the world markets and has held much of the world's buffer or reserve stocks. U.S. coarse grain stocks typically have been drawn down much further and more rapidly than non-U.S. stocks when world grain supplies are short. Conversely, when world production is large, most of the surplus tends to be accumulated and stored in the U.S. Consequently, U.S. coarse grain carryover stocks have fluctuated from a low of 15.5 million metric tons to a high of 62.6 million tons in the last decade—more than five times the range of non-U.S. stocks. The U.S. share of world coarse grain carryover stocks has fluctuated from a low of 27.1 percent in 1974-75 to an expected 60.3

Table 3. Wheat Exports by Major Non-U.S. Exporters, July-June 1981-82 and Comparisons with Recent Years in Millions of Metric Tons.[a]

	1978-79	1979-80	1980-81	Est. 1981-82	% Chg. from 1980
Canada	13.5	15.0	17.0	17.5	+ 2.9
Australia	6.7	14.9	10.6	11.0	+ 3.8
Argentina	3.3	4.7	3.9	4.3	+10.3
European Comm.	8.8	10.4	13.9	13.5	- 2.9
Others	7.4	3.9	6.5	4.0	-38.5
Total	39.7	48.9	51.9	50.3	- 3.1

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982.

Table 4. World Coarse Grain Production, Utilization, Trade and Carryover Stocks in Millions of Metric Tons in 1981-82 and Selected Recent Years.[a]

July-June Trade Years	Production	Utilization	U.S. Exports	Non-U.S. Exports	Total Trade	Ending Stocks[b]	Stocks as % of Utilization
Est. 1981-82	773.2	749.5	61.8	42.0	103.8	103.8	13.8
1980-81	730.1	741.6	72.4	33.3	105.7	79.8	10.8
1979-80	741.4	740.6	71.6	29.2	100.9	91.1	12.3
1978-79	753.3	747.5	56.9	33.3	90.2	90.2	12.1
1976-77	704.4	685.4	50.6	31.9	82.5	75.6	11.0
1971-72	629.6	616.1	24.6	24.4	49.0	85.8	13.9
1966-67	522.0	521.0	20.0	20.0	40.0	76.1	14.6
1960-61	448.3	448.3	15.7	8.3	24.0	109.7	25.1

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982; FG 1-82 (Washington, D.C.), January 20, 1982; FG 18-78 (Washington, D.C.), November 13, 1978; and FG 12-73 (Washington, D.C.), October 26, 1973.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

percent in the 1981-82 marketing year. The current U.S. share will be well above any year of the previous decade. U.S. stocks in tons in 1981-82 are expected to be 19 percent above the recent high point in 1979-80 and more than four times as large as the recent low point in 1974-75. At the same time, non-U.S. stocks are projected to be only the eighth highest level of the last 12 years.

Table 5. U.S. and World Ending Coarse Grain Carryover Stocks, 1969-70 to 1981-82 in Millions of Metric Tons.[a]

Marketing Year	Coarse Grain Carryover Stocks[b] World	Non-U.S.	U.S.	U.S. Stocks as a Percentage of World Carryover
Proj. 1981-82	103.8	41.2	62.6	60.3
1980-81	79.8	45.1	34.7	43.5
1979-80	91.1	38.4	52.7	57.8
1978-79	90.2	43.8	46.4	51.4
1977-78	84.2	42.8	41.5	49.3
1976-77	75.6	45.6	30.0	39.7
1975-76	56.7	39.4	17.3	30.5
1974-75	57.3	41.8	15.5	27.1
1973-74	63.5	41.7	21.8	34.3
1972-73	68.2	36.5	31.7	46.5
1971-72	85.8	39.2	46.6	54.3
1970-71	72.2	39.9	32.3	44.7
1969-70	89.2	43.1	46.1	51.7

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982.

[b]Does not include stocks for Russia, China and certain other centrally planned countries due to lack of published data. Reported total stocks are an aggregate of different marketing years for various countries and thus do not represent inventory levels at a single point in time.

Table 6. Coarse Grain Exports by Major Non-U.S. Exporters, July-June 1981-82 and Comparisons with Recent Years in Millions of Metric Tons.[a]

	1978-79	1979-80	1980-81	Est. 1981-82	% Chg. from 1980-81
Canada	3.9	4.8	4.6	7.5	+63
Australia	2.6	4.1	2.2	3.3	+50
Argentina	11.5	6.6	9.9	14.1	+42
S. Africa	2.9	2.9	3.6	5.0	+39
Thailand	2.3	2.3	2.4	3.2	+33
W. Europe	6.2	5.6	7.3	5.5	−25
Others	2.1	2.0	3.2	3.5	+ 9
Total	31.5	28.3	33.2	42.0	+27

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 23-82 (Washington, D. C.), July 16, 1982.

Policy implications of extreme fluctuations in U.S. coarse grain stocks center around several areas including (1) their impact on variability of grain prices in the U.S. versus major importing nations, (2) equitable sharing of costs for storing the world's reserve stocks, (3) possible destabilizing influences on the U.S. livestock and poultry industry and (4) trade policies that are used to insure that U.S. stocks serve as the primary world reserve.

Table 6 shows coarse grain exports by major non-U.S. exporters in 1981-82 and comparisons with recent years. Coarse grain exports from Canada, Argentina, South Africa and Thailand set new records in 1981-82 and rose sharply above the previous season in Australia. Combined coarse grain exports from all non-U.S. sources rose an estimated 27 percent above the previous season and were 48 percent larger than two years earlier. The sharp rise in exports from these countries reflected nearly ideal growing conditions in many areas and a modest rise in area harvested in 1981-82. Exports from Argentina and Australia have varied substantially from year to year because of highly variable weather conditions in major grain producing areas. Early indications are that coarse grain exports from Argentina and South Africa will decline modestly in 1982-83 because of less favorable growing conditions than a year earlier and a decline in the spring 1982 coarse grain harvest. Preliminary estimates are that combined 1982 production in these two nations was 23 percent below last season. Sizeable carryover stocks will partially but not completely offset sharply lower South African production.

World Rice Supplies, Utilization and Exports

World availability and trade in rice affects the demand for wheat to some extent since both crops are food grains. World rice production as shown in Table 7 rose to a

Table 7. World Milled Rice Production, Utilization, Trade and Carryover Stocks in Millions of Metric Tons in 1981-82 and Selected Recent Years.[a]

July-June Mktg. Yrs.	Production	Utilization	U.S. Exports	Non-U.S. Exports	Total Trade	Ending Stocks[b]	Stocks as % of Utilization
Est. 1981-82	276.0	275.0	3.0	9.2	12.2	25.8	9.4
1980-81	265.7	266.0	3.0	10.6	13.1	24.4	9.2
1979-80	253.9	257.6	2.7	9.8	12.5	24.8	9.6
1978-79	259.3	255.1	2.4	9.3	11.7	28.6	11.2
1976-77	236.2	237.5	2.1	8.4	10.5	17.6	7.4
1971-72	214.9	217.7	1.8	6.9	8.7	16.3	7.5
1966-67	179.3	180.7	1.7	5.7	7.4	11.4	6.3
1961-62	162.9	163.9	0.9	5.6	6.5	7.8	4.8

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982; FG 1-82 (Washington, D.C.), January 20, 1982; FG 18-78 (Washington D.C.), November 13, 1978; and FG 12-73 (Washington, D.C.), October 26, 1973.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

new record in 1981-82. Production increased in Indonesia, Japan, the Republic of Korea, the People's Republic of China, Pakistan, Thailand, Vietnam, the U.S. and several other smaller producers. At the world level, production is estimated to be 3.9 percent above the previous year's record and 8.7 percent above 1979-80. Increased production is being matched by modestly higher utilization, with world stocks remaining near the level of the previous season. However, U.S. stocks are projected to be up sharply to offset smaller stocks in other nations.

From a longer-term perspective, 1981-82 world rice production is 17 percent above five years earlier, 28 percent above a decade ago and 69 percent above two decades earlier. Thus, production has trended upward substantially in the last 20 years. World supplies can be characterized as ample in 1981-82 although world carryover stocks are at modest levels when expressed as a percentage of annual requirements. World stocks are projected at 9 percent of annual requirements, down from a recent high of 11 percent in 1978-79. With large crops in several major importing nations, world rice trade in 1981-82 fell slightly below the previous season, but was 40 percent larger than a decade earlier and nearly double the level of 20 years earlier.

1981-82 World Grain Trade Below Long-Term Growth Trend

Combined world trade in food and feed grains expanded at a phenomenal rate in the 1970's with Russia and Eastern Europe emerging as major importers and with strong economic growth elsewhere. Table 8 shows the average annual growth in world grain exports during the decade was 10.4 million metric tons, nearly three times the absolute growth rate of the previous decade. Preliminary data indicate world grain trade grew by only 2.4 million metric tons in the July-June 1981-82 world trade year. That was the slowest growth in trade since the 1974-75 recession year when world grain trade declined by nearly 7 million metric tons. For reasons noted previously, world grain trade in the next few years is expected to grow more slowly than in the 1970's. However, an upturn in world economic activity should push the average growth rate for the 1980's somewhat above the unusually low 1981-82 level.

Table 8. Annual Change in Total World Grain Trade, 1961-62 through 1981-82 in Millions of Metric Tons.[a]

Marketing Year	Change from Previous Year in Total Trade	Marketing Year	Change from Previous Year in Total Trade
1961-62	+11.0	1971-72	+ 0.1
1962-63	− 1.2	1972-73	+24.5
1963-64	+15.5	1973-74	+ 7.8
1964-65	− 2.8	1974-75	− 6.5
1965-66	+15.7	1975-76	+16.3
1966-67	− 6.7	1976-77	+ 4.2
1967-68	− 7.1	1977-78	+10.3
1968-69	− 8.5	1978-79	+ 7.4
1969-70	+ 8.4	1979-80	+25.8
1970-71	+12.9	Prelim. 1980-81	+12.1
Ave. Yearly Change	+ 3.7	Ave. Yearly Change	+10.4
		Prelim. 1981-82	+ 2.4

[a]Source: Compiled from U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982.

To put recent growth in world grain trade in perspective, continued growth at the 1970's rate would expand world exports in 1991-92 to about 316 million metric tons, nearly 50 percent above the current level. Such an increase in world trade would be equivalent to one-third of the record 1981 U.S. grain production and clearly would represent a sizeable challenge to the world agricultural production and marketing system. At the other extreme, a continuation of the 1981-82 growth rate would increase world grain trade by a meager 24 million metric tons by 1991-92—the equivalent of 7 percent of the record 1981 U.S. harvest. Lack of significant growth in world trade in the 1980's would bring a need for production control programs and other efforts to curtail or manage rising carryover stocks in major grain exporting nations. While this latter situation seems unlikely, it demonstrates that world economic conditions are a key variable in future U.S. and world agricultural trade.

World Soybean and Oilseed Situation in 1981-82

World production of oilseeds has risen sharply above the weather-reduced 1980-81 harvest, but remains slightly below the record output of two years earlier. With an economic recession in most industrial nations, utilization in 1981-82 is growing more slowly than in the decade of the 1970's. However, consumption of oilseeds and products has recovered moderately from the depressed 1980-81 level and may slightly exceed the previous record in 1979-80. World trade in oilseeds and products has expanded substantially in the past year, with sharply higher imports into Western Europe and the Soviet Union. Increased utilization and trade may absorb much of the increase in 1981-82 production, leaving ending oilseed carryover stocks near the levels of the previous two seasons. However, protein meal and vegetable oil carryover stocks in 1981-82 are expected to be moderately below last season. In general, the world oilseed situation in 1981-82 is characterized by fully adequate supplies and modest carryover stocks when expressed as percentages of annual utilization.

Early and very tentative production prospects in mid-1982 pointed to some tightening of world oilseed supplies in the 1982-83 season. Brazil's spring 1982 harvest fell moderately below the previous year's record because of drought in parts of its soybean belt. Additionally, only a modest increase in harvested 1982 U.S. soybean acreage was indicated at mid-year. If these prospects materialize and yields are near the average of recent years, some reduction in world carryover stocks would be possible in 1982-83.

Table 9. World, U.S. and Foreign Production of Oilseed Products in 1971-72, 1979-80, 1980-81 and 1981-82 in Millions of Metric Tons.[a]

	44% Protein Meal Equivalent					Fat and Oil Production				
	1971-72	1979-80	1980-81	Prelim. 1981-82	% Change 1971-81	1971-72	1979-80	1980-81	Prelim. 1981-82	% Change 1971-81
U.S.	25.2	50.1	39.2	44.9	+78	10.4	17.4	14.3	15.8	+52
Non-U.S.	30.3	45.9	46.0	46.8	+54	32.0	41.5	42.3	42.9	+34
World Total	55.5	96.0	85.2	91.7	+65	42.4	58.9	56.6	58.7	+38

[a]Source: U.S. Department of Agriculture, *Foreign Agricultural Circular, Oilseeds and Products*, FOP 16-78 (Washington, D.C.), November 1978, and FOP 5-82 (Washington, D.C.), May 1982.

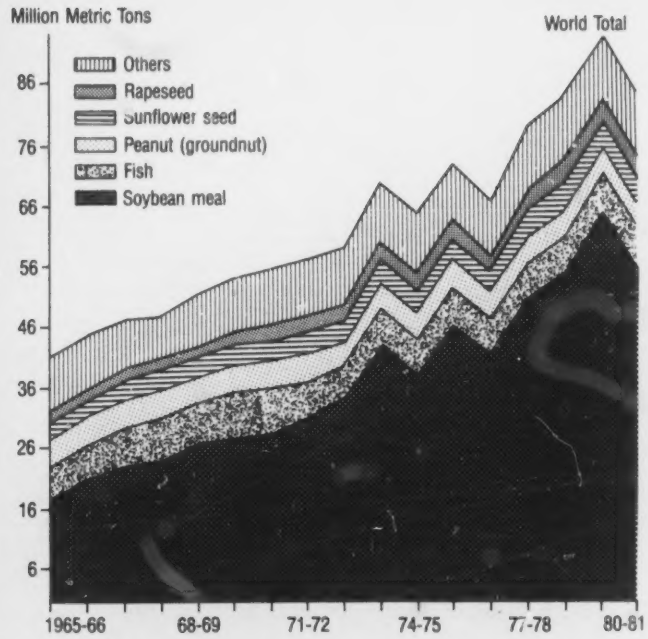


Figure 2. World Protein Meal Production by Type of Product, 1965-1981.

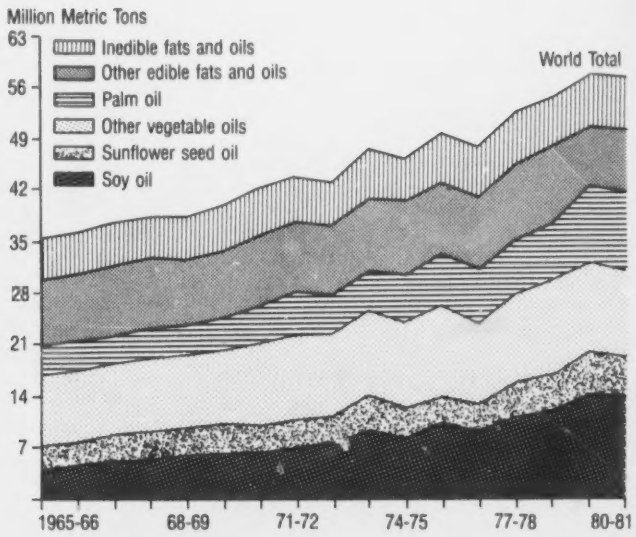


Figure 3. World Edible and Inedible Oil Production by Type of Product, 1965-1981.

Table 9 shows world and U.S. production of oilseed products in 1981-82 and comparisons with recent years. U.S. protein meal and U.S. fat and oil production have been below the 1979-80 record but up sharply from the level of ten years ago. U.S. protein meal production in 1981-82 in 44 percent soybean meal equivalent is 78 percent above a decade earlier. Growth in U.S. protein meal production has substantially exceeded the longer-term growth in protein meal production in the rest of the world. Non-U.S. fat and oil production has shown more consistent growth than protein meal output, with new records being established in 1980-81 and 1981-82. World production in 1981-82 is estimated to be 38 percent larger than a decade earlier, with production growing at a much more rapid rate in the U.S. than in other areas. Since world population expanded by about one-fourth during the decade, per capita production of protein meal and fats and oils increased substantially during the decade.

World Area Devoted to Grain and Oilseed Production

The upward trend in world grain and oilseed production in the past two decades reflects both an increase in area harvested and higher yields per hectare. These trends continued in the 1981-82 trade year, with world average yields for rice and coarse grains setting new records. The world average wheat yield at 1.92 tons per hectare fell 2 percent below the 1978-79 record. As data in Table 10 indicate, average yields for wheat, rice and coarse grains have risen 17 to 18 percent in the last decade. Wheat and rice area harvested is now about one-tenth larger than ten years ago, while the world coarse grain area harvested increased only about 4 percent during the same period. Thus, food grain production has grown more rapidly than coarse grain production in the last decade.

Future increases in world cropland area will likely occur more slowly than in the 1970's. Large land areas still are available for conversion to crop production in Brazil and Argentina. However, substantial costs for land clearing, transportation systems and other supporting services will restrict land development in those areas unless economic incentives are substantial. Some additional land also is available for cropping in North America, but its conversion to cropland will be restricted by location, erosion hazards, drainage problems and other limitations. Additional land is available for crop production in the Soviet Union although climatic limitations and other factors will keep development costs high in that area.

Future increases in yields per hectare will depend on (1) broader use of currently available technology, (2) development and application of new technology and (3) no major change in the world's climate. Developments so far point to a continuation of the upward trend in yields for the years immediately ahead, with year-to-year fluctuations as a result of weather. But with a slower growth in the cropland base, world grain production in the next few years could increase more slowly than in the last two decades.

Grain Area Harvested in Selected Exporting Regions

Much of the expansion in coarse grain area harvested in exporting nations during the last decade has been in the U.S., as shown in Table 11. Coarse grain area expanded

Table 10. World Yields in Metric Tons Per Hectare, and Harvested Area Devoted to Grains and Major Oilseeds, 1981-82 and Comparisons with Recent Years.[a]

July-June Years	Wheat		Rice		Coarse Grains		Oilseeds	
	Tons/Hectare	Mil. Hectares	Tons/Hectare	Mil. Hectares	Tons/Hectare	Mil. Hectares	Tons/Hectare	Mil. Hectares
1961-62	1.12	202.4	2.01	120.1	1.35	322.9	[b]	[b]
1971-72	1.64	213.0	2.41	132.0	1.89	333.9	[b]	[b]
1976-77	1.81	232.5	2.47	141.6	2.05	343.7	1.08[c]	122.6[c]
1980-81	1.86	235.9	2.75	144.1	2.13	340.9	1.17	127.6
Prelim. 1981-82	1.92	236.2	2.83	144.8	2.23	345.8	1.24	130.6
% Chg. from 1971-72	+17	+11	+17	+10	+18	+ 4	[b]	[b]

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 16-82 (Washington, D.C.), May 13, 1982; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 6-82 (Washington, D.C.), May 1982, and FOP 20-79 (Washington, D.C.), October 1979.

[b]Data are not available for these years.

[c]1972-73 through 1976-77 averages.

Table 11. Wheat and Coarse Grain Area Harvested in Millions of Hectares by Selected Grain Exporters, 1981-1982 and Comparisons with Recent Years.[a]

Area or Country	Coarse Grains				Wheat			
	1970-71	1975-76	1978-79	Prelim. 1981-82	1970-71	1975-76	1978-79	Prelim. 1981-82
Western Europe	24.0	25.2	25.3	24.3	17.0	15.4	15.9	16.3
Canada	8.4	8.6	7.8	9.2	5.1	9.1	10.6	12.2
Australia	4.3	3.9	4.7	5.0	6.5	8.6	10.2	11.9
Argentina	7.5	5.9	6.3	6.3	3.7	5.3	4.7	5.5
South Africa	5.5	5.6	5.3	5.3	1.9	1.8	1.8	1.8
Total above	49.7	49.2	49.4	50.1	34.2	40.2	43.2	47.7
U.S.	39.7	42.6	43.2	43.5	17.7	28.1	22.9	32.8
Total	89.4	91.8	92.6	93.6	51.9	68.3	66.1	80.5

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 13-82 (Washington, D.C.), April 26, 1982; FG 16-75 (Washington, D.C.), December 22, 1975; and FG 7-77 (Washington, D.C.), July 1977.

slightly in Western Europe in the mid-1970's—at the expense of wheat. However, by 1981-82 West European coarse grain area had declined to approximately the same level as at the beginning of the previous decade. Southern Hemisphere area harvested varies slightly from year to year as a result of the variable rainfall in that part of the world. Argentine coarse grain area in 1981-82, while up from the mid-1970's, remained modestly below the level of 11 years earlier. Smaller coarse grain area there was offset by expanded wheat plantings. In Australia, both wheat and coarse grain area harvested trended upward during the decade. South African coarse grain area declined while wheat area remained approximately constant during the decade. Canadian grain plantings followed the U.S. trend, with a modest increase in coarse grain area and a sharp increase in harvested wheat area. U.S. wheat area harvested rose by 85 percent during the 11-year period along with a 139 percent rise in Canadian wheat area. Coarse grain area expanded by approximately 10 percent in both countries during the same period. The greater expansion in wheat area reflects wheat prices that were above normal relative to feed grains, the return of fallow land to production and some conversion of pasture and forage land to wheat production.

Table 12. Soybean Area Harvested in Millions of Hectares in Major Producing Countries, 1981-82 and Comparisons with Recent Years.[a]

	1970-71	1975-76	1978-79	1979-80	1980-81	1981-82	Percent Change from 1970-71
U.S.	16.7	20.8	23.4	28.6	27.5	27.0	+ 62
Brazil	1.3	5.8	7.8	8.8	8.5	8.4	+ 546
Argentina	0.03	0.4	1.3	2.0	1.7	2.1	+6,900
China	8.0	8.8	6.8	7.3	7.3	8.0	0
Canada	0.1	0.2	0.2	0.3	0.3	0.3	+ 200
Paraguay	0.04	0.2	0.3	0.4	0.4	0.4	+ 900
Total	26.17	36.2	39.8	47.4	45.7	46.2	+ 77

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production,* WCP 6-82 (Washington, D.C.), May 10, 1982; and *Foreign Agriculture Circular, Oilseeds and Products,* FOP 6-81 (Washington, D.C.), March 1981.

Harvested Soybean Area in Major Producing Countries

Harvested soybean area in major producing nations expanded by 77 percent between 1970-71 and 1981-82, as shown in Table 12. China was the only major producer showing no increase in soybean area in the 11-year period; all others sharply expanded the cropland area devoted to soybean production. However, total soybean area in major producing countries has stabilized in the last three years. During the 11-year period, increased U.S. harvested soybean area accounted for 51 percent of the total expansion in area of major producers. The U.S. accounts for over one-half of the world's total area of soybeans harvested.

Grain and Soybean Yields, Selected Exporting Nations

World average yields of coarse grains, wheat and soybeans have trended upward since the mid-1970's, as data in Table 13 indicate. Variations in yields from country to country reflect differences in application of available production technology and management practices as well as differences in climate and soil types. U.S. coarse grain yields are more than double the world average along with wheat and soybean yields moderately higher than the world average. Canada and Argentina in some years have experienced soybean yields above the U.S. average. Brazilian yields of both coarse grain and wheat consistently have been below the world average. The variation in yields among countries suggests a potential for increased world average yields in the years ahead as currently available technology becomes more extensively used in major grain producing nations.

Table 13. Comparative Yields in Metric Tons Per Hectare of Selected Grain and Soybean Exporting Countries.[a]

	Coarse Grains			Wheat			Soybeans		
	1975-76	1979-80	Prelim. 1981-82	1975-76	1979-80	Prelim. 1981-82	1975-76	1979-80	Prelim. 1981-82
U.S.	4.35	5.71	5.72	2.06	2.30	2.32	1.94	2.16	2.05
Canada	2.31	2.63	2.78	1.80	1.64	2.00	2.32	2.37	2.20
Argentina	2.44	2.20	3.03	1.63	1.69	1.41	1.60	1.80	2.07
Brazil	1.34	1.73	1.73	0.92	0.75	1.15	1.72	1.73	1.60
Australia	1.43	1.47	1.35	1.40	1.45	1.38	1.73	1.83	1.41
World	1.84	2.17	2.22	1.56	1.86	1.92	1.65	1.82	1.74

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, World Crop Production*, WCP 4-82 (Washington, D.C.), April 12, 1982; *Foreign Agriculture Circular, Grains* FG 7-77 (Washington, D.C.), July 1977; and *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-78 (Washington, D.C.), April 1978.

Per Capita Grain Production and Population Growth, Selected Critical Areas

The 1981 issue of this report reviewed 20-year trends in population growth and per capita grain production in Developed Market Economies, Centrally Planned Economies and two categories of developing nations.[1] The first two of these economic groupings of nations experienced a substantial upward trend in per capita grain production and slowing population growth rates. The latter two categories, however, experienced continued rapid population growth and only small improvements in per capita grain production. To identify geographic areas where progress in improving per capita grain production has been disappointing, Figures 4 and 5 show population growth rates, total population and per capita grain production in selected areas of Africa, the Indian subcontinent and Latin America.[2]

As Figure 4 illustrates, the population growth rate of North Africa has been relatively high and trending upward in the past two decades. From 1977 through 1979, population in this area expanded at 2.8 to 3.0 percent per year—up from 1.9 percent in 1961. Because of a highly variable climate, per capita grain production in North Africa fluctuated substantially from year to year with a low of 290 pounds per person in 1961 and a high of 435 pounds in 1968. By 1979, per capita production had declined to 338 pounds and a further sharp decline likely occurred with the severe drought of 1981.

In Sub-Saharan Africa (see Figure 4), annual population growth has frequently exceeded 3 percent, with the growth rate increasing slightly during the past decade. Per capita grain production varied modestly from year to year with a general upward trend until 1976. Since that time, however, per capita production has declined slightly with a leveling off of grain production and continued rapid growth in population. In 1979, per capita production in this area was only 40 percent as large as in North Africa. The 1979 population of Sub-Saharan Africa as defined here totaled 265 million persons, about 15 percent more than the U.S. population.[3]

Southern Africa is a significant grain producing and exporting area. Its per capita grain production is high but has varied widely from year to year because of changing weather conditions. Per capita production ranged from a high of 1,141 pounds in 1973 to a low of 540 pounds in 1972. Production in 1979 was 866 pounds per person, more than six times as large as in Sub-Saharan Africa but approximately the same level as in the early 1960's. Population growth in Southern Africa has been relatively rapid, but the growth rate has trended downward in the past two decades.

The Indian subcontinent represents the largest population of the various regions examined here, with an estimated population of 940 million persons in 1979. Two decades earlier this area had a population of about 600 million. Population growth rates in this area have held relatively steady for the past two decades at approximately 2.2 percent per year. Per capita grain production trended slightly upward from 1960 through the late 1970's before declining in 1979 as a result of less favorable weather. Per capita grain production for the Indian subcontinent as a whole was 480 pounds in 1979—more than three times as large as in Sub-Saharan Africa.

Central American population growth has been slightly less rapid than in Sub-Saharan Africa, but at 2.5 to 3.0 percent per year is still much higher than in developed nations. Per capita production in this region declined slightly from 1960 to 1967 before turning upward in the late 1960's and 1970's. Production per person in 1978 and 1979 was 60 to 72 percent larger than in Sub-Saharan Africa.

Mexico has experienced the most rapid population growth rate of the seven regions examined here. The Mexican population grew at a slightly accelerating rate during the 1960's and 1970's, with its annual growth rate exceeding 3.6 percent in 1979. Mexico's total population grew from only 36 million persons in 1960 to 69 million in 1979—about one-fourth the size of the USSR population. Even though Mexican grain production has doubled in the last two decades, per capita grain production has changed only slightly during the same period.

South America has experienced a 2.0 to 2.8 percent annual growth rate in the past two decades, more than twice the growth rate of the developed market economies. The current South American population is approximately the same size as that of the U.S. With Argentina as a major grain exporter, South American per capita grain production is much higher than in many developing areas. Per person production was 595 pounds in 1979, 47 pounds higher than two decades earlier but modestly below the peak levels of 1964 and the mid-1970's.

These trends indicate (1) developing nations have made substantial progress in expanding grain production in the past two decades, (2) population growth rates remain high (by developed country standards) in the regions examined here, (3) in many of these areas, per capita grain production has changed only modestly in the past two decades and (4) per capita grain production in Sub-Saharan Africa is sharply below that of other developing regions.

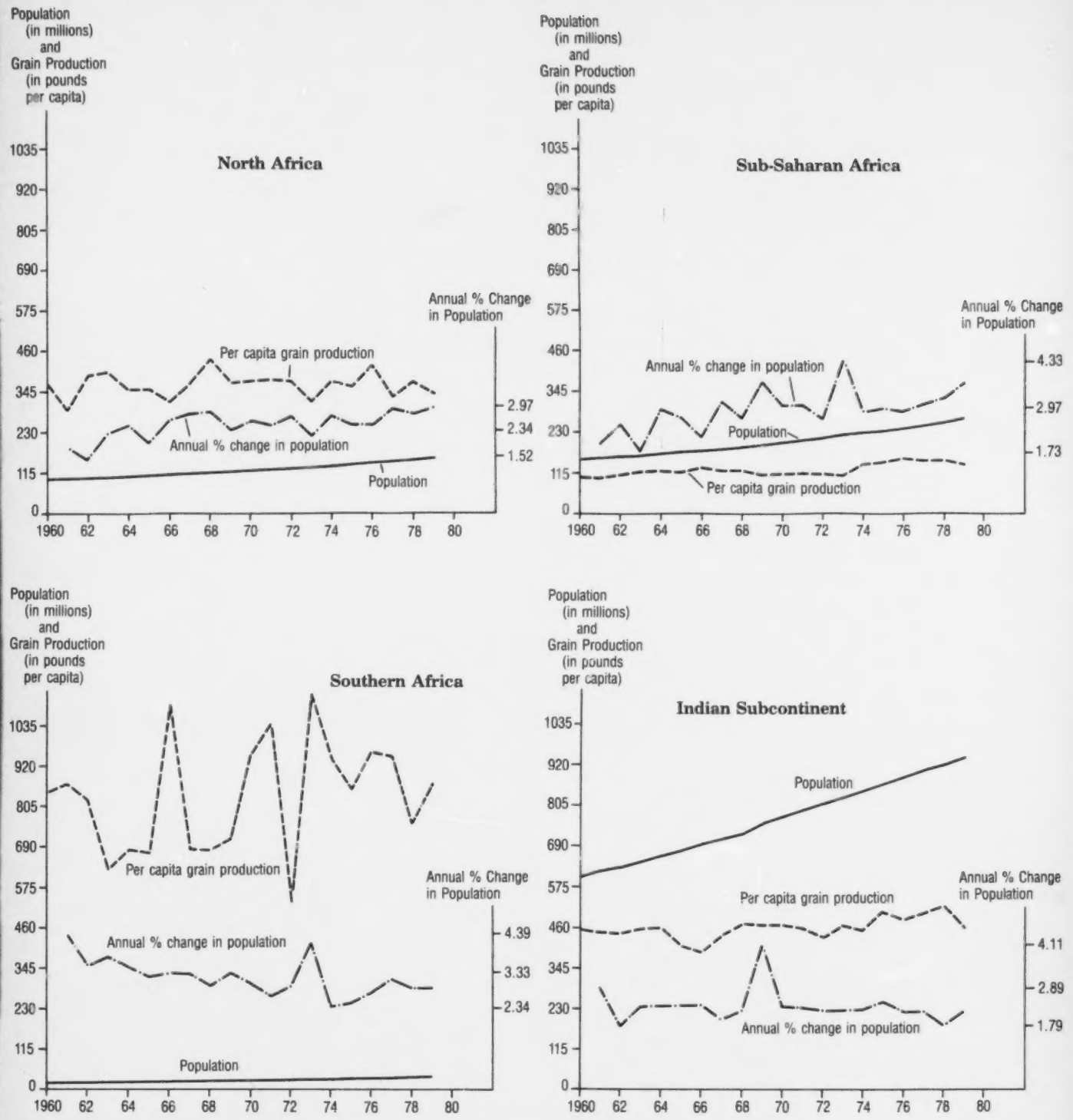


Figure 4. Trends in Population, Population Growth Rates and Per Capita Grain Production in Selected Areas of Africa and the Indian Subcontinent, 1960-1979.

Note: Unusual yearly fluctuations in the population growth rates are due to data limitations in population series for developing countries.

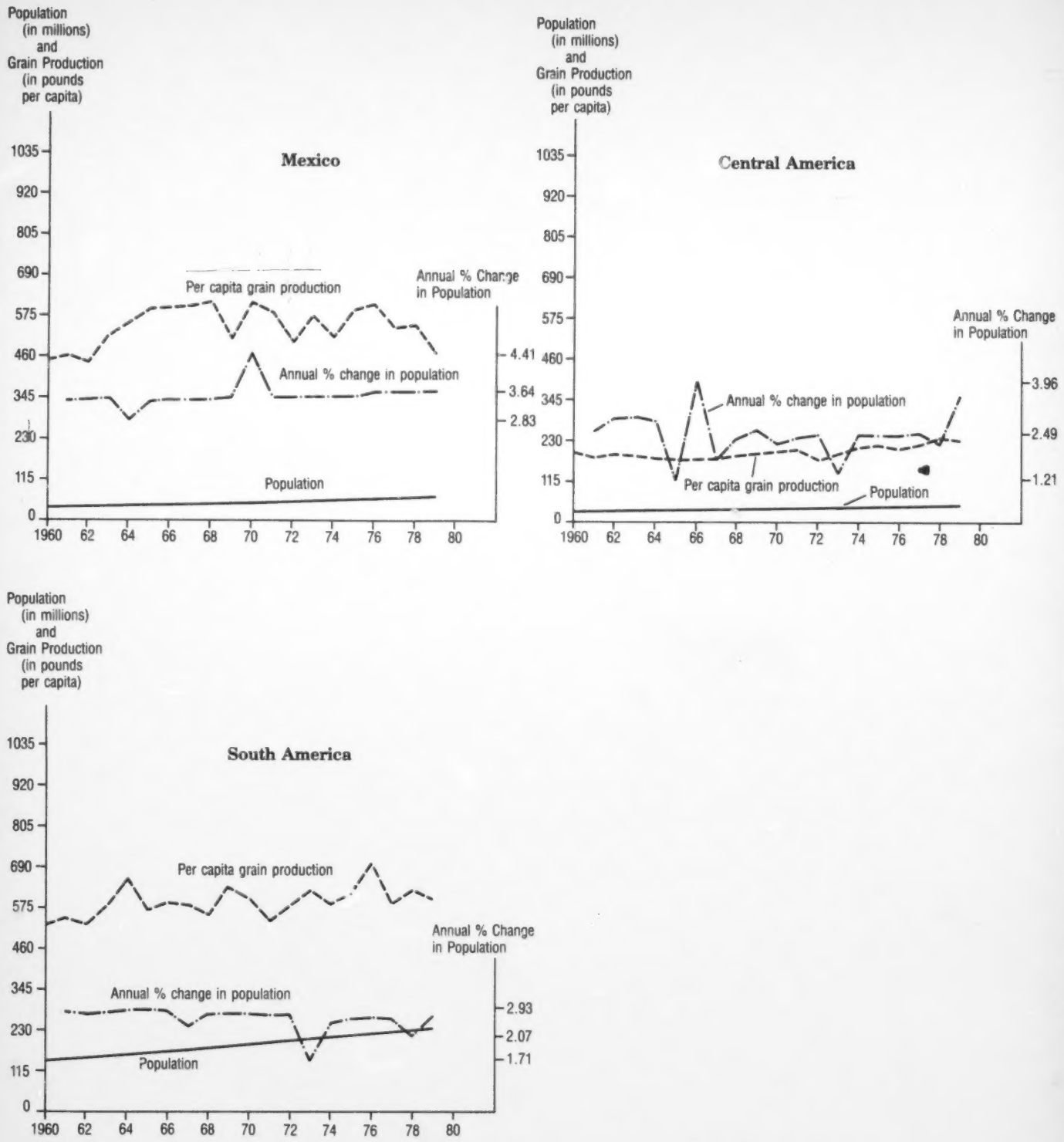


Figure 5. Trends in Population, Population Growth Rates and Per Capita Grain Production in Selected Areas of Latin America, 1960-1979.

Note: Unusual yearly fluctuations in the population growth rates are due to data limitations in population series for developing nations.

Cassava Root Production

While grain production is the major energy source for human consumption and livestock feeding, cassava is an important food and feed crop in many tropical countries. Cassava is a root crop sometimes known as tapioca. Major producers of this crop are Thailand, Indonesia, Nigeria, Zaire and Brazil. A sizeable part of Thailand's production is exported to the European Community (EC) for use in livestock and poultry feeds, and to a lesser extent to the Soviet Union for the same purpose. The EC has recently negotiated trade agreements with major cassava exporters in an effort to limits its imports. Cassava imports compete with domestic European grain producers, thus contributing to EC agricultural surpluses and raising the cost of EC farm price support programs. Other important importers of cassava include the Republic of Korea and Japan.

Table 14 shows estimated cassava production in major producing nations from 1979 through 1981 and tentative forecasts for 1982. World production increased by an estimated 6 percent in 1981 at the same time that record world grain crops were being harvested. Record cassava production has caused slightly increased competition in world grain markets. Early 1982 prospects pointed to another small increase in the world cassava crop, with production forecast to be 9 percent larger than in 1979. World production in 1980 was estimated at the equivalent of the food energy from 40 million metric tons of grain or 2.8 percent of 1980-81 world grain production.[4]

Table 14. Cassava Production in Major Producing Nations from 1979 through 1982 in Millions of Metric Tons.[a]

Area or Country	1979	1980	1981	1982
China	2.5	3.0	3.1	3.1
India	6.1	6.0	6.3	6.4
Indonesia	13.8	13.5	14.0	14.3
Philippines	2.2	2.3	2.3	2.4
Thailand	12.1	13.5	17.0	16.0
Far East Total	41.5	42.9	47.0	47.0
Ghana	2.2	2.3	2.3	2.4
Mozambique	2.7	2.8	2.8	2.9
Nigeria	10.5	11.0	11.2	11.4
Tanzania	4.6	4.6	4.7	4.8
Zaire	12.0	12.2	13.0	13.3
Africa Total	45.6	46.5	48.0	49.0
Brazil	25.0	23.4	25.6	26.0
Columbia	1.9	2.2	2.2	2.2
Latin America Total	30.0	30.0	32.2	32.6
World Total	118.3	119.7	127.4	129.0

[a]Source: Food and Agriculture Organizations of the United Nations, *Food Outlook*, No. 3, 1982 (Rome, Italy), March 23, 1982.

Production in all major producing areas has expanded in recent years. In areas such as Africa, extensive production of cassava partially offsets the relatively low level of per capita grain production. In Brazil, part of the cassava crop in future years is expected to be used as a feedstock for alcohol fuel production.[5]

World Fertilizer Production Trends and Projections Through the Mid-1980's

Increasing use of fertilizer has contributed substantially to the upward trend in global grain yields in the last two decades. To maintain growth of world grain production in the years ahead, expanded fertilizer production capacity will be required. Table 15 shows the trend in world fertilizer production since 1960 and recent projections of 1985-86 production capacity by the United Nations Food and Agriculture Organization and the World Bank.

World nitrogen fertilizer production on a plant nutrient basis increased by 528 percent in the last two decades, with production slightly more than doubling in the 1970's. Recent projections indicate 1985-86 production capacity will be about 20 percent greater than in 1980-81. In absolute terms, the projected capacity reflects an annual growth at about three-fourths the expansion rate of the 1970's. Only modest increases in nitrogen fertilizer capacity are projected for North America and Western Europe. Much larger growth rates are projected for Latin America, the Middle East, the Far East and the USSR where natural gas supplies for nitrogen production are more abundant. These projections indicate nitrogen fertilizer supplies should be adequate to maintain an upward trend in global grain yields into the mid-1980's.

Table 15. World Fertilizer Production by Type of Nutrient, 1960-61 to 1980-81, and Projections of Production Capacity to 1985-86.[a]

Nutrient Type	1960-61	1970-71	1975-76	1979-80	Prelim. 1980-81	Projected Capacity 1981-82	1985-86
Nitrogen	9.98	30.20	44.1	59.72	62.70	66.52	75.48
Phosphate	9.74	19.28	29.2	33.47	34.45	37.30	43.26
Potash	8.71	16.72	23.9	25.85	27.43	30.08	36.77

[a]Sources: United Nations Food and Agriculture Organization, *Annual Fertilizer Review* (Rome, Italy), various issues; United Nations Food and Agriculture Organization, *Food Outlook* (Rome, Italy), March 23, 1982; U.S. Department of Agriculture, Economics Research Service, *Fertilizer Outlook and Situation*, FS-12 (Washington, D.C.), December 1981; and Richard B. Reidinger, *World Fertilizer Review and Prospects to 1980-81*, U.S. Department of Agriculture, Economic Research Service, Foreign Agricultural Economic Report No. 115 (Washington, D.C.), February 1976. Data are in millions of metric tons of plant nutrient equivalent.

World phosphate fertilizer production increased by an estimated 254 percent from 1960-61 to 1980-81. An additional 26 percent or 8.8 million ton increase is projected from 1980-81 to 1985-86. In absolute terms, projected production capacity reflects a slightly faster annual growth rate than the average for the 1970's. Projected 1985-86 capacity is based on a modest increase in North America, substantial increases in Africa and the USSR and very little increase in capacity elsewhere.

World potash fertilizer production grew by 215 percent in the past 20 years. Production capacity is projected to expand by another 34 percent or 9.3 million metric tons in the five years ending in 1985-86. Projected capacity reflects an annual growth rate about one and three-fourths times as large as in the 1970's. Thus, global potash fertilizer production should be adequate to meet expanded needs in the years immediately ahead. According to the projections, West European potash fertilizer production capacity will decline slightly in the early 1980's, but will be more than offset by sharp expansions in Eastern Europe and the USSR and a moderate expansion in North America.

Financial Restraints on World Food Trade in 1981-82 and Beyond

World grain trade in 1981-82 is being restrained by three important financial developments: (1) an economic recession in major industrial nations, (2) a sharp rise in the value of the U.S. dollar in world currency markets after nearly a decade of depreciation and (3) East European financial problems resulting from a heavy accumulation of debt. The economic recession in part reflects a shift toward more restrictive monetary policy in the U.S. and several other industrial nations in an effort to slow inflation. The consensus among many economic forecasters is that the U.S. and world economies will follow modestly restrictive monetary policies with a modest growth pattern into the mid-1980's and beyond, but that growth will be at a slower rate than the extremely strong performance of the 1970's.[6]

Strengthening U.S. Dollar

Strength of the U.S. dollar in relation to the West German mark and the Japanese yen is illustrated in Figures 6 and 7. The stronger dollar reflects high U.S. interest rates that have attracted funds into the U.S., as well as an expectation that U.S. inflation rates in future years will be below the highly inflationary years of the 1970's. A stronger dollar adds to foreign buyers' costs of purchasing U.S. agricultural products and thus tends to restrain trade in such commodities or encourages foreign buyers to seek non-U.S. sources of supply. When foreign currencies were exchanged for U.S. dollars, their purchasing power in some cases was more than one-third less in 1981 and early 1982 than in the previous three or four years.

Since world petroleum sales are priced in U.S. dollars, the stronger dollar also increased the cost of imported oil in many nations from late 1980 through mid-1982. Higher costs for imported petroleum have drawn funds away from other uses, thus tending to restrict economic growth in countries that rely heavily on oil imports.

Figure 6 indicates the U.S. dollar was about 41 percent higher in relation to the German mark in April 1982 than at its low point in 1979 and 1980. The dollar has appreciated by a similar amount in relation to several other major European currencies. As indicated in Figure 7, the dollar has shown a less consistent upward trend in relation to the Japanese yen in the last two years than with the West German mark. In early 1982, the dollar's exchange value in relation to the yen was 26 percent higher than at the recent low point in 1978. Thus, strength of the dollar has had slightly less impact on Japanese users of certain agricultural commodities than on West European users.

In evaluating the impact of changing currency values on U.S. exports, one should also note that the European Community (EC) in its Common Agricultural Policy applies monetary compensatory amounts (MCA's) to compensate for the impact of changing currency values on prices paid by final users of wheat and feed grains. Thus, EC consumers of these products are insulated to a considerable extent from changing world currency markets. However, MCA's are not applied to soybeans, soybean products and other oilseeds. These products thus are potentially more sensitive to dramatic changes in the value of the dollar than are grains.[7]

In Japan, domestic prices for wheat and livestock products are well above world levels and are supported by government pricing policies and/or import restrictions. In the short run, changing currency values have little impact on the price paid by final Japanese users for these products. However, costs to Japanese consumers for feed grains and soybean products are quickly and directly affected by changes in the U.S. dollar/yen exchange rate. While consumers of other products may be affected much less, a stronger dollar also can give Japanese importing firms an incentive to shift to supplies from other countries where the yen has a stronger exchange rate.

Figure 6. Value of U.S. Dollar Relative to West German Mark, 1970-1982.

Figure 7. Value of U.S. Dollar Relative to Japanese Yen, 1970-82.

Future trends in the value of the dollar will depend heavily on U.S. monetary and fiscal policy as well as political stability in the Middle East and Europe. At this writing, many trade and currency analysts anticipate the dollar will remain firm in world currency markets in the years immediately ahead, but will not strengthen as sharply as in the 1981-early 1982 period.

Debt Accumulations in Eastern Europe and Elsewhere

Eastern Europe was a rapidly growing market for U.S. grains and oilseed products in the mid-to-late 1970's as nations in that area increased their livestock and poultry production. Until recently, it was widely anticipated that Eastern Europe would maintain its rapid growth of farm product imports well into the 1980's. However, long-term growth prospects must be reevaluated in light of sizeable debt accumulations throughout the region and debt repayment problems emerging in late 1981 and early 1982. Repayment problems there reflect high interest rates, increased costs of energy imports, a sluggish world economy and substantial reliance on external financing to support economic growth.

Table 16 shows the trend in East European debt to the West from 1971 through 1979. Net debt of the region increased approximately tenfold in the 1970's, reaching nearly $50 billion in 1979. Poland had the largest outstanding debt with the West at that time and expanded its debt load much more rapidly during the nine-year period than its neighbors. While precise data are not readily available on the debt trend since 1979, financial trade sources indicate East European debts have continued to climb. For example, these sources indicate Romanian outstanding debt with the West was $9.7 to $12 billion in early 1982—up 44 to 79 percent from 1979. In May 1982, Romania was attempting to reschedule $2.3 billion or 80 percent of its outstanding debt originally scheduled for repayment in 1982. These debts reportedly are owed to between 240 and 320 Western banks and numerous commercial firms supplying Romania's imports.[8]

Similar although more severe debt servicing problems have developed in Poland and potential problems exist in other East European nations.[9] Such problems greatly reduce the willingness of private banks to extend further credit for farm product imports. As a result, grain imports into Eastern Europe may grow more slowly in the years immediately ahead than in the late 1970's.

Trade sources indicate outstanding debt with the West also has increased in recent years in nations such as the Soviet Union, Mexico, Nigeria and other developing nations.[10] Because of serious debt servicing problems, Mexico in early 1982 announced it was applying import restrictions to 825 non-essential items.[11] In an economic environment where inflation rates are slowing, these debt committments may continue to restrain the growth of trade in agricultural and non-agricultural products in the next few years.

Table 16. Eastern Europe's Net Hard Currency Debt to the West, 1971 to 1979 in Millions of U.S. Dollars.[a]

Country	1971	1972	1973	1974	1975	1976	1977	1978	1979
Bulgaria	723	909	997	1,360	2,257	2,756	3,169	3,710	3,730
Czechoslovakia	160	176	273	640	827	1,434	2,121	2,513	3,070
E. Germany	1,205	1,229	1,876	2,592	3,548	5,047	6,159	7,548	8,440
Hungary	848	1,055	1,096	1,537	2,195	2,852	4,491	6,532	7,320
Poland	764	1,150	2,213	4,120	7,381	10,680	13,532	16,972	20,000
Romania	1,227	1,204	1,495	2,483	2,449	2,528	3,388	4,992	6,700
Total, 6 nations	4,927	5,723	7,950	12,732	18,657	25,297	32,860	42,267	49,260

[a]Source: U.S. Central Intelligence Agency, National Foreign Assessment Center, *Handbook of Economic Statistics 1980*, ER 80-10452 (Washington, D.C.), October 1980, p.39.

World Livestock and Poultry Production Trends

World inventories of hogs (swine) and cattle and poultry production are important indicators of aggregate world demand for coarse grains and protein meal. These products are used largely as livestock and poultry feeds. World growth of livestock inventories slowed considerably in the 1981 and 1982 period and is partially responsible for slower growth in world coarse grain trade.

Hog and Poultry Production

World hog and poultry production expanded sharply from 1977 through 1980, as shown in Tables 17 and 18. Then, in the next two years, world hog inventories dropped slightly as a result of a global economic recession and relatively tight world grain supplies from mid-1980 through mid-1981. The decline was concentrated largely in North America, where grain prices are more responsive to changing supplies than in other areas. East European hog inventories also declined slightly in 1981 and 1982 because of deteriorating economic conditions and inadequate domestic grain supplies. Hog inventories continued to increase slightly in Western Europe and Japan in 1981 and early 1982, but at a much slower rate than in the late 1970's.

World hog inventories (excluding the People's Republic of China) increased by 13 percent from 1977 to 1980, but declined by an estimated 1 percent from January 1980 to January 1982. In the same respective time periods, North American hog inventories are estimated to have increased by 22 percent and declined by 6 percent. Mexico's hog inventory continued to expand from 1980 to 1982, while U.S. and Canadian hog production declined substantially. Soviet hog inventories expanded by 16 percent from 1977 through 1980 but remained relatively constant from 1980 through early 1982 as a result of poor crops and limited domestic grain supplies. The small decline in world hog inventories in the past two years has been an important factor behind the slower growth of world coarse grain utilization since 1980.

Poultry meat production in developed market economies continued to expand through 1981 as shown in Table 18, despite relatively tight world grain supplies and above-normal feed costs in 1980-81. Poultry industries require fewer pounds of feed per pound of meat produced than either pork or beef production, and thus are strong competitors with other meats when grain and protein meal are in short supply. Preliminary data indicate 1981 poultry meat production declined slightly from the previous year in Canada but expanded moderately in the EC and U.S. and remained constant in Japan.

Global poultry and hog production in the years immediately ahead will depend heavily on the timing of the recovery in the world economy and on the cost and availability of coarse grains and protein meal. With approximately normal world crop production in 1982-83, an increase in world poultry and hog production would likely begin by early or mid-1983.

World Cattle Inventories

World cattle inventories are a less reliable indicator of livestock feed demand than are hogs and poultry since in many areas cattle are fed largely on forage crops and pasture. However, grain is used extensively in cattle rations in North America, parts of Europe and the Soviet Union. Table 19 indicates world cattle numbers (excluding the People's Republic of China) declined from 1977 through 1979, then resumed a long-term upward trend into 1982. The sharpest percentage declines in the late 1970's occurred in North America, Australia and New Zealand. Declining cattle numbers in these areas reflected a long-term cycle in which cattle producers overexpand in response to favorable prices and later reduce production as large supplies depress prices. Cattle inventories in Central and South America, Asia and the USSR continued to increase during the late 1970's. With a resumption of modest world economic growth, the world cattle population appears likely to increase modestly in the years immediately ahead.

Table 17. Hog Inventories in Selected Major World Producing Regions from January 1, 1977 through January 1, 1982 in Millions of Head.[a]

Region	1977	1978	1979	1980	Prelim. 1981	Estimated 1982
North America	73.4	75.8	81.1	89.9	87.0	84.1
Central America & Caribbean	3.9	4.0	3.8	3.3	3.2	3.3
South America	50.3	51.7	50.7	52.0	50.5	51.5
Asia (excl. PRC)[b]	28.0	29.9	31.8	34.1	33.7	34.8
Western Europe	93.7	97.4	101.1	102.6	103.5	103.9
Eastern Europe	63.7	69.3	70.3	71.3	70.9	70.8
U.S.S.R.	63.1	70.5	73.5	73.9	73.4	73.5
Others	4.2	4.0	4.1	4.3	4.2	4.2
Total (excl. PRC)	380.3	402.6	416.4	431.3	426.3	426.0

[a]Source: U.S. Department of Agriculture, *Foreign Agriculture Circular, Livestock and Meat,* FLM 7-81 (Washington, D.C.), December 1981.

[b]Data are not available for the People's Republic of China.

Table 18. Poultry Meat Production in Selected Major Producing Regions, 1978-1981 in Millions of Metric Tons Product Weight Equivalent.[a]

Region or Country	1978	1979	Prelim. 1980	Estimated 1981
United States	5.85	6.48	6.59	6.93
Canada	0.48	0.54	0.53	0.52
European Community (EC-10)	3.70	3.79	4.00	4.18
Japan	1.03	1.11	1.15	1.15
Total	11.06	11.92	12.26	12.78

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Meat,* FLM 6-81 (Washington, D.C.), October 1981.

Increasing cattle inventories should slightly expand global demand for coarse grains into at least the mid-1980's.

Per Capita Meat Consumption

Per capita meat consumption varies widely from country to country depending on income levels, the composition of domestic agriculture, cultural patterns and a number of other factors. Argentina and Australia traditionally have led the world in red meat consumption per person—because of vast grazing lands and relatively small domestic populations. Other countries with high levels of per capita meat consumption in 1980 (see Table 20) were the U.S., the European Community, East Germany and Poland, all with over 65 kilograms per person. Consumption in these nations is an indicator of the long-term potential growth in livestock consumption in areas such as Mexico, the USSR, Yugoslavia and Brazil. Whether this long-term growth potential is realized will depend on consumer incomes and the cost and availability of feed ingredients. Similar conclusions can be drawn regarding per capita poultry meat consumption.

Table 19. Cattle and Buffalo Inventories in Major World Producing Regions, 1977 through 1982 in Millions of Head.[a]

Region or Country	1977	1978	1979	1980	Prelim. 1981	Est. 1982
North America	165.9	158.9	152.5	153.1	157.1	161.1
Central America & Caribbean	13.2	13.7	14.2	14.4	14.6	15.1
South America	207.6	204.7	204.8	205.7	208.5	208.6
Asia (excl. PRC)[b]	267.3	269.2	269.6	268.9	269.9	270.8
Western Europe	92.0	93.1	93.4	93.7	92.7	92.1
Eastern Europe	37.8	38.2	38.6	38.4	37.7	37.4
U.S.S.R.	110.3	112.7	114.7	115.0	115.1	115.3
Australia & N. Zealand	40.3	37.7	35.1	34.3	33.5	33.2
Total (excl PRC)[c]	947.3	941.3	936.5	937.1	942.3	946.7

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Meat*, FLM 7-81 (Washington, D.C.), December 1981.

[b]Data are not available for the People's Republic of China.

[c]Totals may not add due to rounding.

Table 20. Red Meat and Poultry Consumption Per Capita in Selected Countries and Regions in 1975 and 1980 in Kilograms.[a]

	Red Meat		Poultry (Dressed Weight)	
	1975	Prelim. 1980	1975	Prelim. 1980
United States	83.1	83.3	22.5	28.9
Mexico	21.7	22.3	5.4	6.4
Argentina	99.0	102.5	9.7	9.2
Brazil	27.2	25.5	4.0	9.5
European Community	59.0	65.0	12.0	13.7
East Germany	69.3	97.0	7.5	9.5
Poland	72.5	70.2	6.7	12.2
Yugoslavia	37.3	40.5	8.8	13.9
U.S.S.R.	44.6	49.2	5.4	9.0
Japan	17.1	22.2	6.9	10.6
Iran	11.7	13.6[b]	4.2	5.7[b]
Taiwan	22.6	29.8	[c]	[c]
South Africa	29.5	30.1	8.7	9.2
Australia	108.5	85.6	13.9	21.5

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Livestock and Meat*, FLM 5-80 (Washington, D.C.), August 1980.

[b]Data are for 1978 since more recent data are unavailable.

[c]Data are not available.

Role of U.S. Agricultural Exports in World Trade

U.S. agricultural exports dominate world trade in wheat, coarse grains and soybeans and are a major factor in world soybean product and rice trading. But as strong world competition has demonstrated in the 1981-82 trade year, dominant shares of trade do not indicate the U.S. is in a monopoly position in these products. Instead they are an indication of the efficiency of the U.S. agricultural production system and long-term growth in world demand. Dominant shares of world trade also mean that U.S. crop conditions, farm policies and reserve programs have a major affect on the cost and availability of grains and oilseeds in world markets. Growing world trade and U.S. dependence on foreign markets also mean the economic health of U.S. agriculture is increasingly linked to world weather, foreign industrial production, currency values and political developments.

Table 21. U.S. Shares of World Trade in Grains and Soybeans in 1961-62, 1971-72, 1976-77, 1980-81 and 1981-82.[a]

	1961-62	1971-72	1976-77	1980-81	1981-82
	(Percent of World Trade)				
Wheat	46.7	31.9	40.9	44.8	49.0
Coarse grains	65.4	50.2	61.3	68.9	59.5
Rice	13.8	20.5	21.6	23.6	23.1
Soybeans	87.5	94.3	79.0	78.4	85.1
Soybean meal	98.4	89.9	68.4	31.0	34.2
Soybean oil	72.9	95.1	71.6	21.2	25.4

[a]Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Oilseeds and Products,* FOP 9-82 (Washington, D.C.), July 1982; FFO 1-70 (Washington, D.C.), February 1970; FFO 11-66 (Washington, D.C.), October 1966; Alan Holz "World Oilseed and Products Outlook, Appendix Tables and Charts," unpublished material distributed at the 1980 U.S. Agricultural Outlook Conference, U.S. Department of Agriculture, South Building, Washington, D.C., November 7, 1979; and U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains,* FG 23-82 (Washington, D.C.), July 16, 1982.

U.S. Shares of World Coarse Grain, Wheat and Soybeans Exports

Despite statements in the popular press which leave the opposite impression, preliminary data indicate the U.S. shares of world wheat and soybean exports increased significantly in 1981-82. The U.S. share of world coarse grain exports, however, declined sharply. U.S. coarse grain exports in 1981-82 are estimated to account for 60 percent of the world total, well above a decade earlier but down from 68.9 percent in the previous trade year. U.S. wheat exports in 1981-82, as shown in Table 21, accounted for approximately 1 bushel out of every 2 traded in world markets. A decade earlier, U.S. exports accounted for slightly less than one-third of the total world wheat trade. U.S. rice exports accounted for about 1 ton out of every 4 traded in the world, a surprisingly large share when one considers that the U.S. accounts for only 2 percent of world rice production. U.S. exports of unprocessed soybeans in 1981-82 rose to an estimated 85 percent of all soybeans traded in world markets, reversing a downward trend in the U.S. share of global exports during the 1970's.

U.S. Shares of World Soybean Product Exports

The U.S. shares of world soybean meal and oil exports also rose modestly in the 1981-82 trade year, but remain at much lower levels than those for unprocessed grains and soybeans. U.S. shares of world trade in soybean products are well below the levels of the 1960's and early 1970's as a result of expanded soybean processing capacity in Brazil and Western Europe. A substantial portion of Western Europe's soybean meal and oil exports are processed from U.S. soybeans.

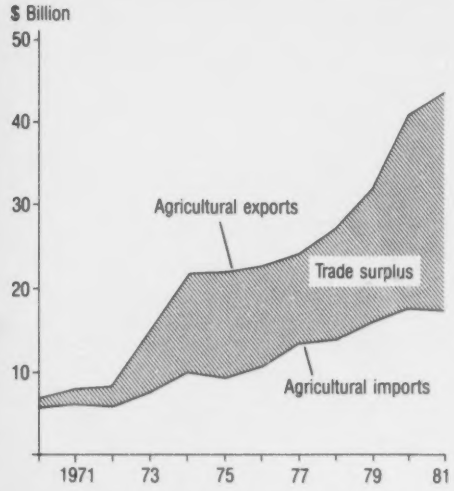


Figure 8. Dollar Value of U.S. Agricultural Exports and Imports, 1970-1981.

Despite slow growth in world trade in the past year, agricultural exports continued to play a major role in the U.S. economy. Earnings from U.S. farm products in the 1980-81 fiscal year ending September 30 totaled $43.8 billion, a new record for the twelfth consecutive year and 8 percent above 1979-80.[12] In comparison, U.S. agricultural exports 12 years earlier amounted to only $7.0 billion. Preliminary forecasts are that U.S. agricultural exports in the 1981-82 fiscal year will total $42.5 billion, the first decline in 13 years. The projected decline reflects a total tonnage of exports slightly above last season combined with lower prices for most major crop products than in the 1980-81 marketing year.[13]

Exports at the current level represent 31 percent of the cash receipts from U.S. farm product marketings, although not all export earnings are returned to farmers.[14] Part of the total return is shared with agribusiness firms, transportation companies and other processors, handlers and merchandisers to cover costs of getting products from the farm to port locations and other exporting points. Production from 1 out of every 3 U.S. harvested acres presently is being exported, with the exact percentage varying substantially from one crop to another.

U.S. agricultural imports totaled $17.2 billion in the 1980-81 fiscal year, 1 percent

Figure 9. Net U.S. Trade Balance in Agricultural and Non-Agricultural Products by Calendar Years, 1956 through 1981.

Sources: U.S. Department of Agriculture, Economics and Statistics Service, *U.S. Foreign Agricultural Trade Statistical Report, Calendar Year 1979* (Washington, D.C.), October 1980, and U.S. Department of Agriculture, *Foreign Agricultural Trade of the United States* (Washington, D.C.), January/February 1982.

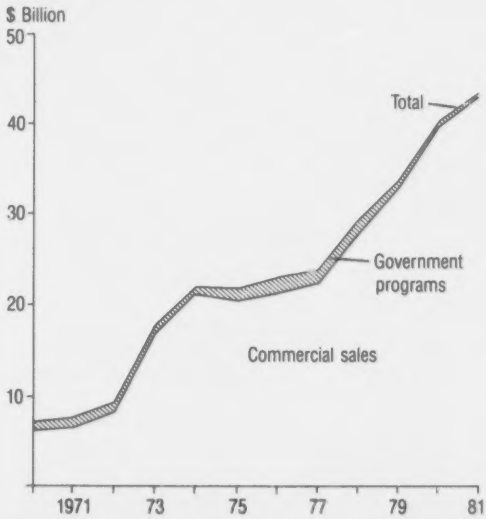


Figure 10. Dollar Value of U.S. Agricultural Exports Under Government Programs and Commercial Sales, 1970-1981 Calendar Years.

below the previous year and the first decline in farm product imports since 1974-75.[15] That left a net positive balance in U.S. agricultural trade of $26.6 billion, also a new record. U.S. agricultural imports are projected to decline again in 1981-82 as a result of the U.S. recession and plentiful domestic supplies. The large surplus in farm product exports partially offsets a substantial deficit in U.S. non-agricultural trade, a deficit that has been increasing in recent years (see Figure 9). Growth of the non-agricultural trade deficit in the 1970's reflected increasing crude oil prices, with the cost of U.S. petroleum imports reaching $75.6 billion in calendar year 1981.[16] In a very real sense, the surplus in U.S. agricultural trade has helped to pay for the nation's imports of petroleum, automobiles, textiles and other consumer goods. Also, without large farm product exports, the dollar almost certainly would be lower valued relative to major foreign currencies and would add to the cost of most products imported into the U.S.

As shown in Figure 10, only a small percentage of U.S. exports are shipped under U.S. government programs. The most significant commodities exported under government export assistance programs are wheat, wheat flour, rice and vegetable oils.[17]

Value of U.S. Farm Product Exports by Commodity Groups

Grains, feeds, oilseeds and oilseed products make up slightly over two-thirds of the total value of U.S. farm product exports, as Figure 11 indicates. In the five years ending Sept. 30, 1981, U.S. exports of these commodities grew in value by 88 percent. U.S. exports of all livestock, meat, dairy and poultry products made up $4.1 billion or 9 percent of the total value of U.S. agricultural exports in fiscal 1980-81. Exports of these products grew in value by 56 percent in the previous five years. An additional $9 billion or 21 percent of the value of U.S. agricultural exports in fiscal 1980-81 came from cotton, tobacco, fruits, vegetables and nuts.

Share of Major U.S. Crops Exported

As illustrated in Figure 12, exports account for well over half of the total demand for the U.S. wheat, cotton and soybean crops and about one-third of the demand for the U.S. corn crop. During the past decade, the shares of production exported have increased most rapidly for cotton, corn and wheat, in that order. Soybeans were an export-oriented crop throughout the 1960's and 1970's, with nearly half the crop exported in 1969-70 and 56 percent exported in 1980-81.

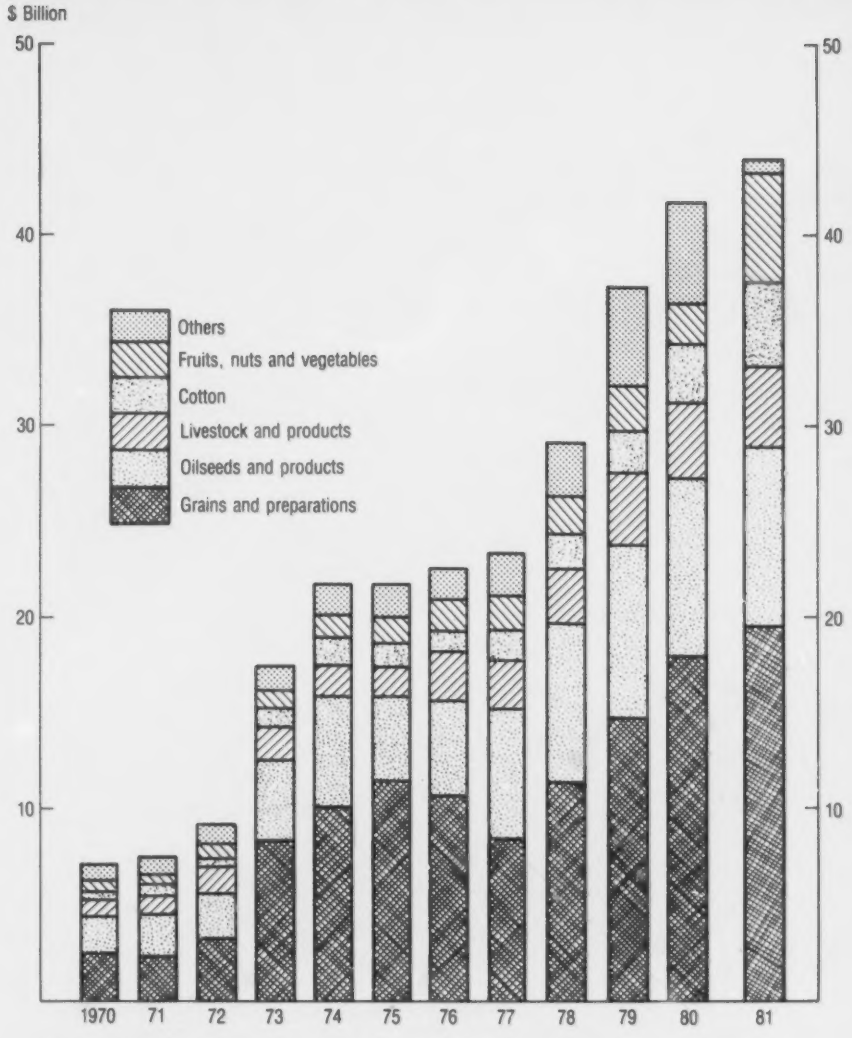


Figure 11. Value of U.S. Agricultural Exports by Commodity, 1970-81 Calendar Years.

Table 22. Composition of U.S. Agricultural Exports by Type of Commodity, 1976-77, 1979-80 and 1980-81 in Billions of Dollars.[a]

Commodity Group	October-September Fiscal Years			Percentage of 1980-81 Total Exports
	1976-77	1979-80	1980-81	
Feed grains	5.39	9.10	10.40	23.7
Oilseeds	4.64	6.79	6.49	14.8
Oilseed meal	0.97	1.72	1.67	3.8
Vegetable oils	0.77	1.24	1.10	2.5
Wheat and wheat producers	3.05	6.63	8.05	18.4
Rice	0.69	1.17	1.54	3.5
Meat and meat products	0.61	0.87	0.99	2.3
Hides and skins	0.80	1.12	1.00	2.3
Dairy products	0.17	0.16	0.25	0.6
Poultry and poultry products	0.30	0.55	0.77	1.8
Other animals & animal products	0.77	1.08	1.11	2.5
Cotton	1.54	3.03	2.48	5.7
Fruits, vegetables and nuts	2.45	4.19	5.41	12.4
Tobacco	1.08	1.35	1.35	3.1
Others	0.78	1.48	1.18	2.6
Total	24.01	40.48	43.79	100

[a]Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November/December 1981 and November 1977.

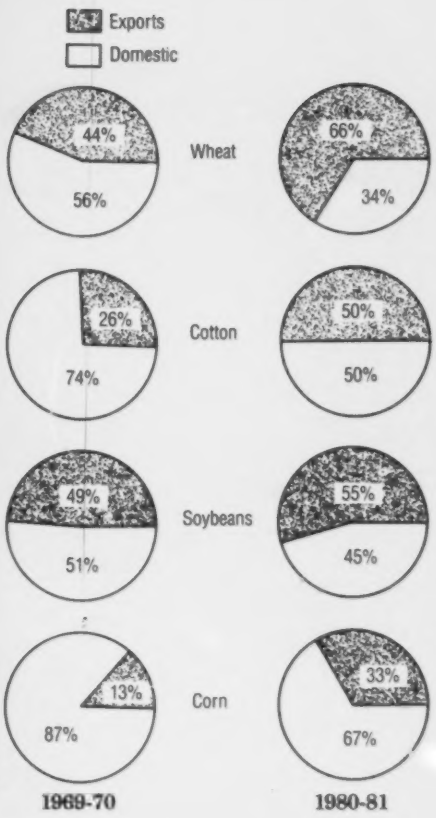


Figure 12. Percentage of Major U.S. Crops Used Domestically and Exported, 1969-70 and 1980-81 Marketing Years.

Table 23. Value of U.S. Agricultural Imports in 1975-76, 1979-80 and 1980-81 October-September Fiscal Years by Commodity Groups in Billions of Dollars.[a]

Product	1975-76	1979-80	1980-81	Percent chg. 1975-76 to 1980-81
Complementary Imports:				
Cocoa and chocolate	0.60	0.97	0.95	+ 46
Coffee	2.39	4.49	3.08	+ 28
Rubber	0.47	0.82	0.77	+ 60
Tea	0.09	0.13	0.13	+ 44
Bananas and plantains	0.26	0.42	0.53	+104
Drugs	0.11	0.15	0.14	+ 27
Others	0.28	0.37	0.32	+ 14
Total complementary imports	4.21	7.35	5.92	+ 41
Supplementary Imports:				
Dairy products	0.26	0.46	0.52	+100
Hides and skins	0.20	0.23	0.28	+ 40
Meat and meat products, excluding poultry	1.44	2.28	2.22	+ 54
Poultry and poultry products, excluding eggs	0.09	0.08	10.10	+ 11
Other animal products and animals	0.33	0.67	0.61	+ 85
Total animals and animal products	2.31	3.71	3.73	+ 61
Fruits, nuts, vegetables and products	0.88	1.65	2.32	+164
Sugar and products	1.35	1.84	2.42	+ 79
Alcoholic beverages	0.43	1.04	1.13	+163
Oilseeds and products	0.54	0.62	0.91	+ 69
Grains, grain products and feed	0.23	0.38	0.41	+ 78
Tobacco	0.28	0.40	0.37	+ 37
Others	0.30	0.31	0.01	- 97
Total supplementary imports	6.31	9.95	11.30	+ 79
Total agricultural imports[b]	10.51	17.30	17.22	+ 64

[a]Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November/December 1981 and November 1977.

[b]Totals may not add due to rounding.

U.S. Agricultural Imports

Foreign trade involves a two-way exchange between nations. Over the longer term to obtain foreign exchange for purchases of U.S. exports, other nations must sell their products in world markets. With this two-way exchange, trading countries tend to export products for which they have a comparative advantage in production. Often they concentrate on producing such products for export and import products that can be produced more economically by their trading partners. In that way, both partners may benefit from trade.[18] The U.S. is a large net exporter of agricultural products, but because of this principle of comparative advantage it also does import sizeable quantities of farm products.

As shown in Table 23, slightly over one-third of all U.S. agricultural imports are products not produced in commercial quantities in the United States because of climatic limitations. Included in this category are coffee, tea, rubber, cocoa, drugs and certain tropical fruits. These products are considered complementary imports since they do not compete directly with U.S. domestic production. Coffee alone accounted for over one-half of the complementary U.S. farm product imports in 1980-81.

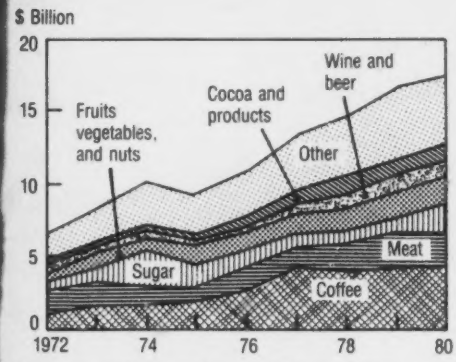
Supplementary imports are those which compete with domestic production. During the last five years, the most rapidly growing categories of U.S. supplementary agricultural imports in dollar value have been fruits and vegetables, sugar, alcoholic beverages and dairy products. Sugar and sugar products surpassed meat in 1980-81 as the largest U.S. agricultural import, as did fruits, nuts, vegetables and products. Total animal and animal product imports including meat, poultry and dairy products in fiscal 1980-81 accounted for 22 percent of all U.S. agricultural imports.

Although the U.S. is a large net exporter of grains and oilseeds, it also imports a small quantity of these products. Such imports reflect movements of products from Canada to the U.S. as well as imports of coconut oil, palm oil and related products originating from Asia and Oceania. Canadian to U.S. movements of grains and oilseeds are small and reflect marketings by Canadian producers and handlers in border states.

Figure 13 shows the trend in total U.S. agricultural imports by commodity groups since 1972. During the past eight years, the total dollar value of such imports has nearly tripled. Figures 14 and 15 show U.S. livestock product exports and meat imports in the past decade. In 1970, the dollar value of U.S. livestock product exports was less than one-third as large as the value of U.S. meat imports. By 1980, U.S. livestock product exports had risen 328 percent in value and slightly exceeded the dollar value of meat imports.

Value of U.S. Agricultural Exports by Leading States and by Final Destination

Agricultural exports from leading states in dollar value for the last three fiscal years are shown in Figure 16. Illinois and Iowa rank first and second in value of farm



Note: Fruits, vegetables, and nuts includes bananas. Other includes dairy products, oilseeds and products, rubber, and other imports.

Figure 13. Value of U.S. Agricultural Imports by Commodity, 1972-1980 Calendar Years.

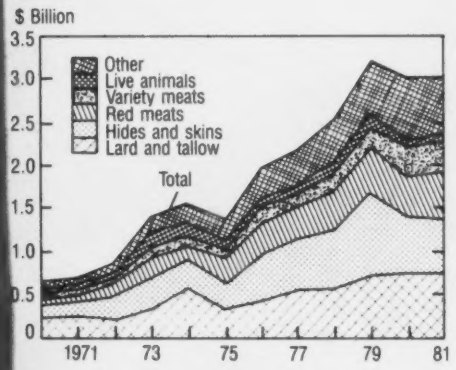


Figure 14. Value of U.S. Livestock Product Exports by Type of Product, 1970-1981 Calendar Years.

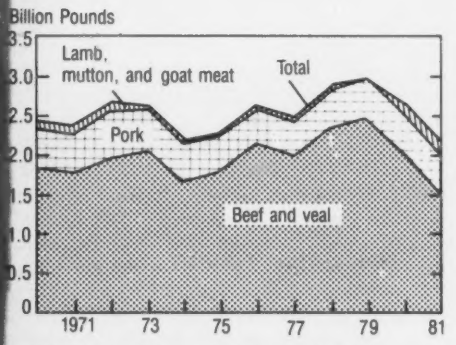


Figure 15. Value of U.S. Red Meat Imports by Type of Product, 1970-1981 Calendar Years.

product exports, reflecting their top ranking among states in corn and soybean production. California and Texas are the third and fourth largest exporters, reflecting exports from diversified agricultural production including fruits, vegetables, grains, cotton and livestock. In overseas markets, Asia has become the largest foreign buyer of U.S. farm products with Japan being the largest single destination (see Figure 17). Western Europe ranks second as an export market for U.S. agricultural products, down from its number one position in 1976-77. Contrary to popular belief, the share of U.S. farm products shipped to the Soviet Union has increased in the past five years. However, U.S. exports to Russia remain much below the total value of U.S. sales to Asia, Western Europe and Latin America.

Trends in U.S. Corn and Coarse Grain Exports by Destination

As Figures 18 and 19 indicate, U.S. corn and coarse grain (feed grain) exports at an annual rate during the first half of fiscal 1981-82 dropped sharply. In the preceding decade, U.S. corn exports rose by an unprecedented 371 percent from 1970-71 to the 1979-80 record level before declining slightly in 1980-81. The severe decline in first-half 1981-82 exports reflects record Southern Hemisphere feed grain crops in the spring of 1981, good grain yields in many Northern Hemisphere areas in the fall of 1981, East-West political tensions and a worldwide slowing of economic growth. U.S. corn exports in the Oct. 1, 1981 through March 30, 1982 period dropped nearly one-fourth below a year earlier, the most severe percentage decline since the mid-1960's.

Declining U.S. corn exports reflected sharply reduced movement to most foreign destinations except the Soviet Union, southwestern Europe, North Africa and the People's Republic of China. Coarse grain crops in these areas were reduced by unfavorable weather. Mexico emerged as a large new market for U.S. corn and coarse grains in the 1979-81 period. But a combination of slower demand growth, two

Figure 17. Value of U.S. Agricultural Exports by Destinations, 1976-77 and Estimated 1981-82.

consecutive years of large crops and more comfortable domestic supplies brought sharply lower corn exports to Mexico in the first half of the 1981-82 marketing year.

Early indications are that U.S. corn exports will increase modestly in late 1982 and early 1983, with the size of the increase depending on the extent and timing of the world economic recovery. Preliminary estimates indicate spring 1982 Southern Hemisphere coarse grain production fell sharply below a year earlier—thus reducing potential competition in world feed grain markets until at least March 1983. The Soviet Union, with three consecutive poor crops (1979-1981) and low grain reserves,

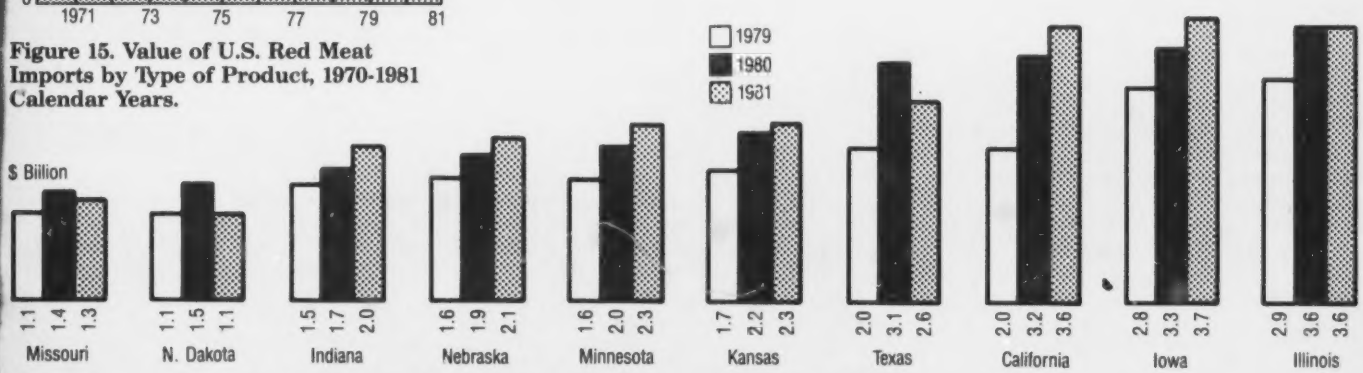


Figure 16. Value of U.S. Agricultural Exports by Leading States, 1979-1981.

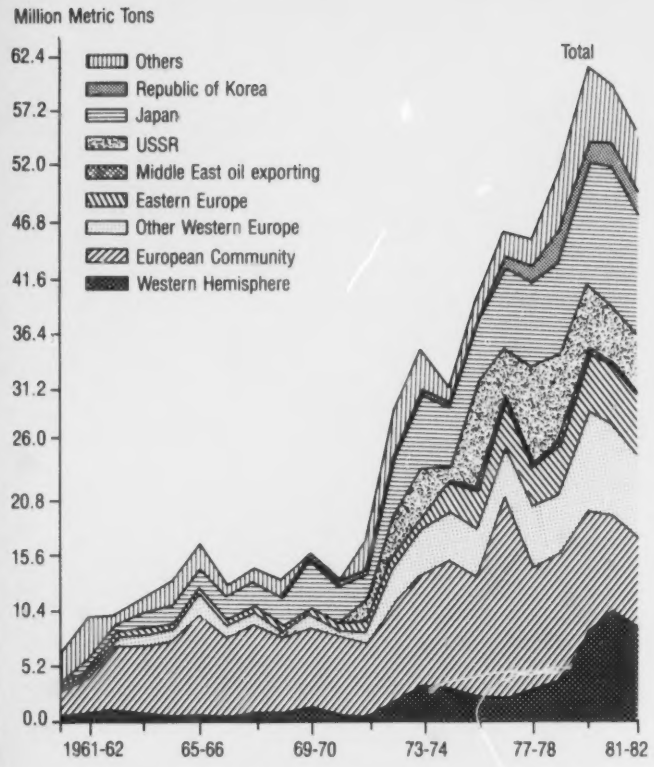


Figure 18. U.S. Corn Exports by Destination, October-September, 1960-61 to 1981-82.

Note: 1981-82 exports are projected using the October 1981-March 1982 percentage change from a year earlier.

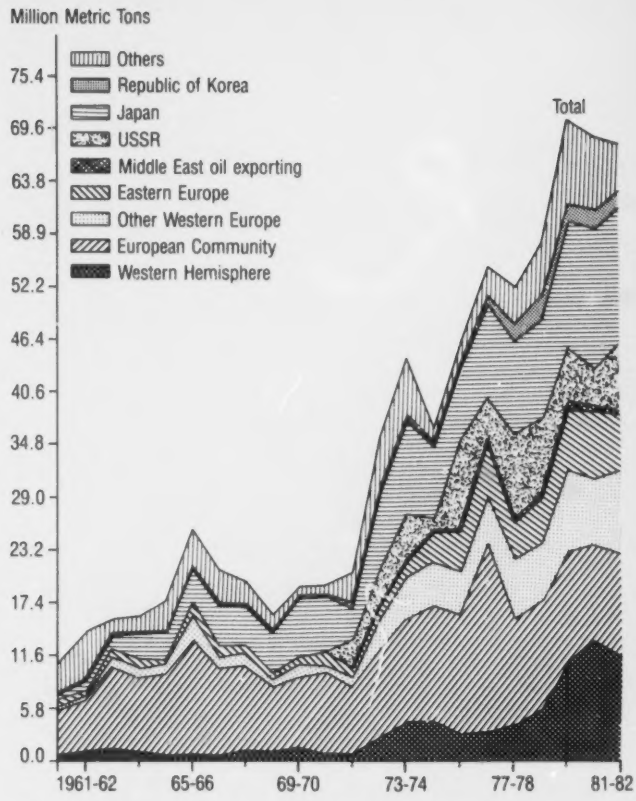


Figure 19. U.S. Coarse Grain Exports by Destination, October-September, 1960-61 to 1981-82.

Note: 1981-82 exports are projected using the October 1981-March 1982 percentage change from a year earlier.

will likely remain a large buyer of grain on world markets for at least the next year or two and probably longer. Reduced availability of Southern Hemisphere coarse grains through March 1983 could generate increased Soviet purchases of U.S. corn in late 1981-82 and early 1982-83.

While long-term prospects for U.S. corn exports are somewhat clouded, a resumption of world economic growth should increase U.S. corn exports modestly in the decade ahead. However, the growth rate of both U.S. corn and total coarse grain exports may be slower than farmers and the grain trade had become accustomed to in the 1970's. Growth at only half the percentage rate of the 1970's would raise U.S. corn exports to 5.6 billion bushels by 1991-92, nearly 3.5 billion bushels above the current level. Exports at 5.6 billion bushels would still present a major challenge to U.S. agriculture and agribusiness. Growth at one-fourth the percentage rate of the 1970's would place corn exports at 3.9 billion bushels by the start of the next decade—about 1.7 billion bushels more than are being exported in 1981-82.

Trends in U.S. Soybean and Soybean Product Exports by Destination

In contrast to corn, U.S. soybean exports dropped sharply in fiscal 1980-81 but recovered dramatically in the first half of 1981-82. The decline in exports in 1980-81 was one of the most severe on record and exceeded the sharp downturn in the 1974-75 recession year. U.S. exports to the European Community, Eastern Europe and several other foreign destinations were down sharply, as indicated in Figure 20. Declining exports in 1980-81 reflected a substantial rise in value of the U.S. dollar relative to major foreign currencies, a sluggish world economy, increased world soybean prices as a result of widespread drought in U.S. producing areas, record spring 1981 South American soybean production and reductions in inventories at overseas processing plants.

The sharp increase in soybean exports in the first half of the 1981-82 marketing year was in response to (1) new foreign buying to rebuild non-U.S. processor inventories to normal working levels, (2) substantial Soviet purchases of oilseeds and products on world markets and (3) foreign buyers growing more accustomed to the higher value of the U.S. dollar in foreign currency markets. Much of the increase occurred through higher U.S. shipments to the European Community.

U.S. soybean exports seem likely to trend upward in the years ahead, but probably at a slower rate than in the 1970's. Export growth through the mid-1980's may be restrained by Eastern Europe's heavy debt committments and expected slower growth in West European livestock and poultry consumption.

U.S. soybean meal exports in the last two decades followed the general trend of soybean exports, but with greater fluctuations in 1970-71, 1972-73, 1976-77 and 1978-79 (see Figure 21). Major destinations for soybean meal are similar to those for soybeans, with the European Community being the dominant and most volatile overseas market for both commodities. Eastern Europe has become a sizeable market for U.S. soybean meal in the last ten years, but remains only a minor outlet for soybeans because of

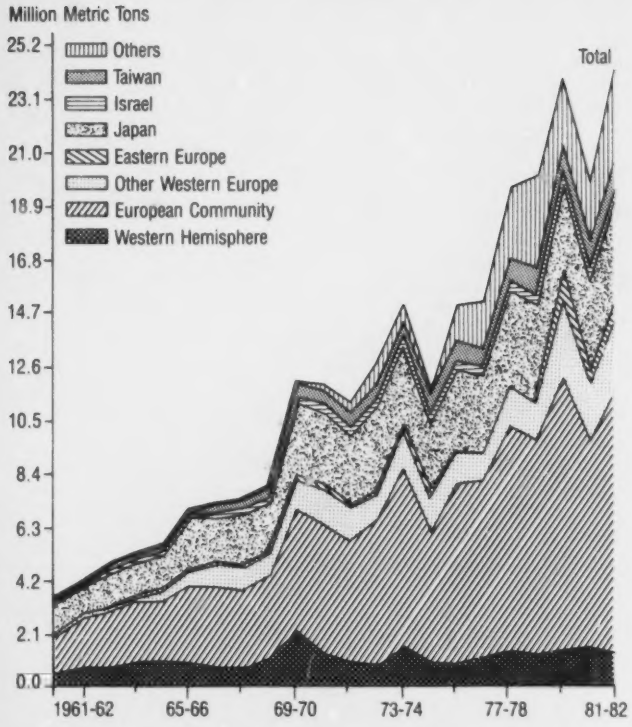


Figure 20. U.S. Soybean Exports by Destination, October-September, 1960-61 to 1981-82.

Note: 1981-82 exports are projected using the October 1981-March 1982 percentage change from a year earlier.

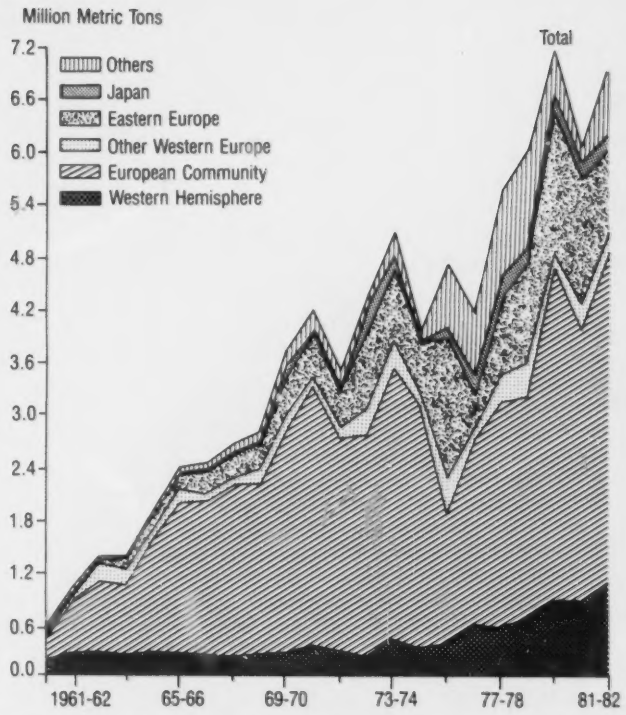


Figure 21. U.S. Soybean Meal Exports by Destination, October-September, 1960-61 to 1981-82.

Note: 1981-82 exports are projected using the October 1981-March 1982 percentage change from a year earlier.

limited processing capacity. Conversely, because Japan has a large processing industry, it is a sizeable importer of soybeans but only a small buyer of U.S. soybean meal. Foreign demand for U.S. soybeans and soybean meal originates largely from livestock and poultry feeding, with year-to-year feed demand depending on the cost and availability of other feed ingredients and the level of livestock and poultry production. U.S. soybean meal exports from October 1980 through September 1981 fell 15 percent below a year earlier because of high prices early in the season, the sharp rise in the value of the U.S. dollar relative to European currencies, record South American soybean meal exports and slower growth in world demand for livestock products.

In the first half of the 1981-82 marketing year, U.S. soybean meal exports were moderately above a year earlier along with the sharp recovery in soybean exports. However, U.S. soybean meal exports during this period were slightly below the 1979-80 record due to sluggish East European demand and large exports of processed soybean products from Brazil. U.S. exports in late 1982 and early 1983 may increase some as a result of an estimated 14 to 18 percent decline in Brazil's spring-harvested 1982 crop. Longer-term growth in U.S. soybean meal exports will depend heavily

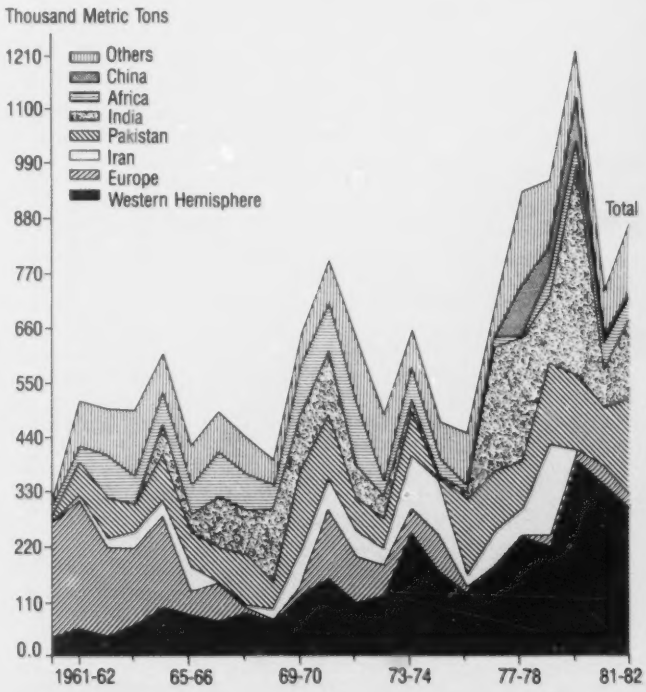


Figure 22. U.S. Soybean Oil Exports by Destination, October-September, 1960-61 to 1981-82.

Note: 1981-82 exports are projected using the October 1981-March 1982 percentage change from a year earlier.

on a recovery in world economic growth, production trends in South America and Eastern Europe's adjustment to its large foreign debt commitments. Developments at this writing suggest the trend in U.S. soybean meal exports will be upward in the 1980's, but with the growth rate likely being slower than the 1970's.

U.S. soybean oil exports move mainly to developing nations and have been much more variable from year to year than either soybean or soybean meal exports (see Figure 22). Soybean oil faces competition from at least a dozen other fats and oils, and represents a much smaller share of its respective world market than soybean meal. Major competitors include butter, lard, palm oil, coconut oil, sunflowerseed oil, rapeseed oil, peanut (or groundnut) oil and olive oil. U.S. soybean oil exports trended downward from 1962 through 1969 and from 1971 through 1975 before literally exploding upward in the late 1970's. India and the Western Hemisphere were major sources of growth in U.S. soybean oil exports from 1975 through 1979-80. However, exports to India dropped sharply in 1980-81 as that country experienced increased domestic production of peanut oil and increased its purchases of South American soybean oil.

U.S. soybean oil exports from October 1981 through March 1982 were modestly above a year earlier but well below the peak level two years earlier. Restraints on U.S. exports in late 1981 and early 1982 included large competing supplies of Brazilian soybean oil, palm oil and coconut oil, and probably some drawing down of inventories in importing nations. These inventories likely were increased in late 1980 as world consumers became concerned about potential supply shortages resulting from the severe 1980 U.S. drought.

Long-term export prospects for U.S. soybean oil are less certain than for products tied closely to growing livestock and poultry demand. Clouded areas in the longer-term outlook include (1) the impact of large debts, high petroleum prices and high interest rates on the availability of foreign exchange in developing nations where U.S. soybean oil is marketed, (2) future trends in world production of palm oil and (3) the extent to which recent low prices for vegetable oil will encourage its use as diesel fuel and as a feedstock for chemical production. Brazil officially is encouraging the use of soybean oil as a fuel for diesel engines, although price relationships through mid-1982 required a substantial subsidy to make it attractive for this purpose. While industrial uses for soybean oil are a minor part of world demand, the real price of soy oil declined sharply in the late 1970's and early 1980's. Trade sources indicate low prices are encouraging the chemical industry to consider increased use of soy oil. However, volatility of soybean oil prices and weather-related variability of supplies may limit its potential for industrial purposes in the years ahead. World palm oil production has expanded substantially in recent years, primarily in Malaysia and Indonesia. Other tropical regions are important potential producers of this product. But the downward trend of world vegetable oil prices and large financing costs may restrain expanded production outside traditional producing areas.

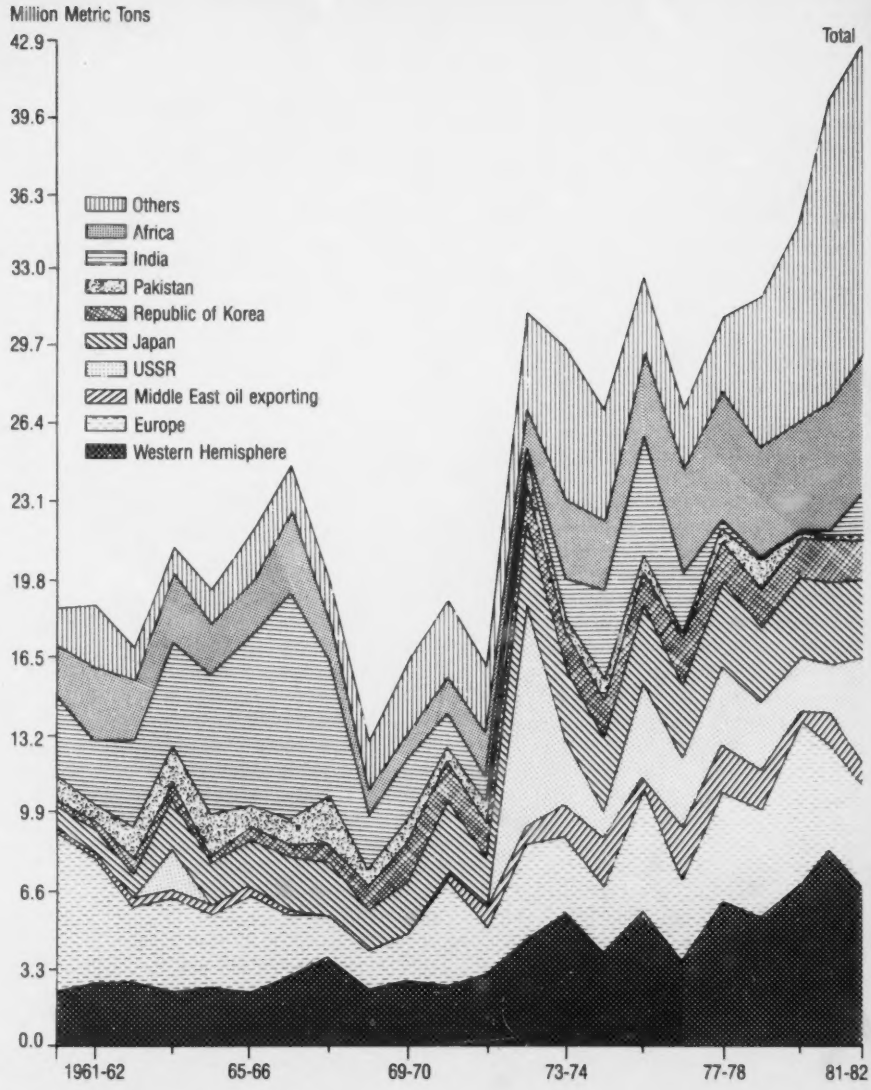


Figure 23. U.S. Wheat Exports by Destination, October-September Fiscal Years, 1960-61 to 1981-82.

Note: 1981-82 exports are projected using the October 1981-March 1982 percentage change from a year earlier.

While there is a potential for increased per capita vegetable oil consumption in many developing nations in the 1980's, U.S. soybean oil exports may trend irregularly upward with continued large year-to-year variations. Future growth in demand for soybean oil will be important to world livestock producers. Slow growth in demand for oil would place upward pressure on protein prices, with soybean meal being forced to carry a larger share of the value of soybeans.

Trends in U.S. Wheat Exports by Destination

After a period of weakness in the late 1960's, U.S. wheat exports rose sharply when the Soviet Union became a major importer in 1972. From 1972 through 1979, wheat exports were confined to a relatively narrow range. Then, in 1980-81 and 1981-82 another upward movement occurred with expanded U.S. exports to Russia, Mexico, Brazil and the People's Republic of China (in the "other" category of Figure 23). In the 1960's and early 1970's, India also was a major and highly variable export market for U.S. wheat. However, with increased production in India in the late 1970's and early 1980's, U.S. wheat exports to that country dropped sharply, falling to zero in 1978-79 and 1979-80. Total U.S. wheat exports in the first half of the 1981-82 fiscal year were well above the same period a year earlier — an indication that wheat exports have been slightly less affected by the world economic recession than either corn or other coarse grains.

U.S. wheat exports in the 1980's will be affected by efforts of Argentina, Australia, Canada, the European Community and Russia to increase production, and by production trends in developing nations. World demand for wheat will likely expand in the years ahead with continued population growth and an expected expansion in world economic output. But the U.S. share of a growing global demand will depend heavily on the success of foreign producers' efforts to expand production more rapidly than in the last decade. Appendix II, Figure 3 indicates several of these nations were able to expand wheat exports more rapidly in the 1970's than the U.S. Since major wheat producers such as Russia, Australia, India and Argentina are located in areas of highly variable weather patterns, U.S. wheat growers also should continue to expect sizeable fluctuations in U.S. exports in the years ahead.

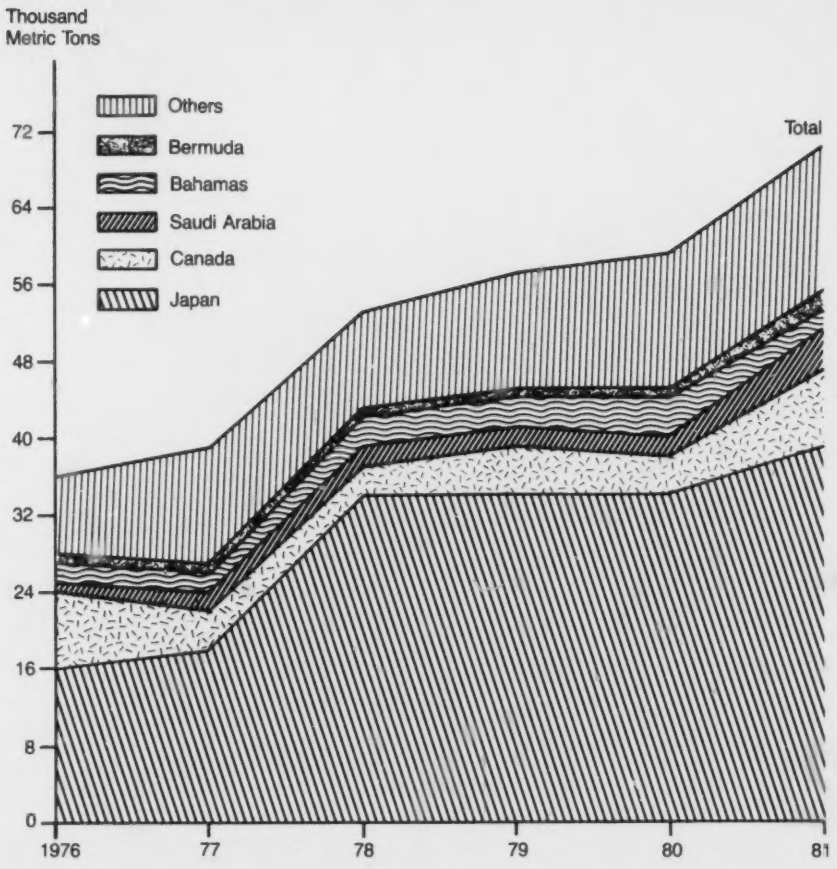


Figure 24. U.S. Beef Exports by Major Destinations, 1975-76 through 1980-81 October-September Fiscal Years.

Trends in U.S. Red Meat Exports

Major foreign destinations for U.S. beef, pork, and edible offal and variety meat exports are shown in Figures 24 through 26. Japan is the largest foreign market for most of these products, with the quantity of U.S. beef and edible offals exported to that destination more than doubling in the last five years. U.S. beef exports to most other major foreign destinations also increased in the past five years, with total tonnage in 1980-81 being approximately twice as large as five years earlier. Japanese purchases of U.S. pork have declined substantially since 1975 along with a sharp drop in pork exports to Canada. The total tonnage of U.S. pork exports in 1980-81 was down 21 percent from five years earlier. Major foreign markets for U.S. edible offals and variety meats are the European Community, Mexico, Japan and Canada. U.S. exports to the Netherlands declined slightly in the five years ended Sept. 30, 1981. However, with the increased exports to Japan, Mexico, Canada and Egypt, the total tonnage of U.S. edible offals and variety meats exports was up about one-third.

Future U.S. exports of meat and meat products will depend heavily on foreign trade policies of the European Community and Japan. Livestock producers in these nations have strong political influence and have discouraged importing of U.S. products that would depress their prices and/or add to domestic surpluses. The problem of foreign restrictions on U.S. meat exports is a difficult one that will not be resolved quickly.

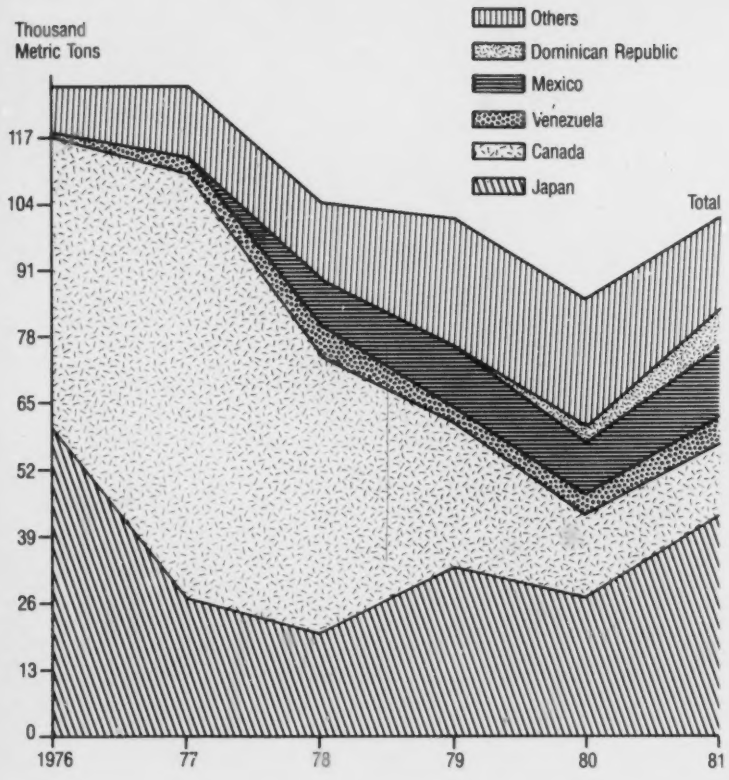


Figure 25. U.S. Pork Exports by Major Destinations, 1975-76 through 1980-81 October-September Fiscal Years.

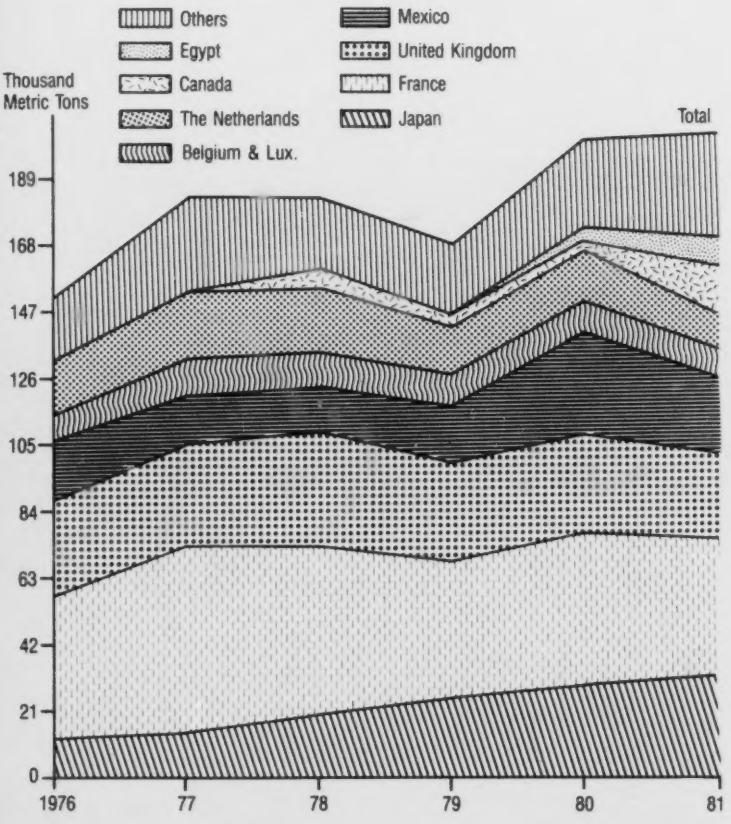


Figure 26. U.S. Exports of Edible Offals and Variety Meats by Major Destinations, 1975-76 through 1980-81 October-September Fiscal Years.

Soviet Grain and Oilseed Importing Patterns

Since its reentry into world markets as a major grain importer in 1972, the Soviet Union has been regarded as a key indicator of world food trade and grain price prospects. Table 24 shows the reason for the extreme importance attached to Soviet grain purchasing patterns. After being a net grain exporter for several years, the USSR shifted abruptly to a large net importer in the early 1970's, and without advance indications to foreign governments or the grain trade. As a result, the Soviet Union's imports in 1972-73 accounted for 18 percent of the world trade in wheat and coarse grains, and grain prices rose sharply with the unexpected increase in trade. In

Table 24. Soviet Grain Imports as a Percentage of Global Wheat and Coarse Grain Trade, 1972-73 through 1981-82.[a]

Year	Percentage Share	Year	Percentage Share
1972-73	18	1977-78	12
1973-74	8	1978-79	9
1974-75	4	1979-80	16
1975-76	18	1980-81	17
1976-77	7	Prelim. 1981-82	22

[a]Compiled from data in U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982, and FG-11-82 (Washington, D.C.), April 13, 1982.

Table 25. Soviet Grain, Soybean and Soybean Meal Importing Patterns, 1975-76 through 1981-82.[a]

	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	Est. 1981-82
	(Mil. Metric Tons)						
Wheat Imports:[b]							
U.S. Origin	4.0	2.9	3.3	2.9	3.9	4.0	7.0
Non-U.S. Origin	6.1	1.7	3.4	2.2	8.1	12.0	12.5
Total	10.1	4.6	6.7	5.1	12.0	16.0	19.5
Feed Grain Imports:[b]							
U.S. Origin	9.9	4.5	9.2	8.3	11.3	4.0	9.5
Non-U.S. Origin	5.7	1.2	2.5	1.7	7.1	14.0	16.0
Total	15.6	5.7	11.7	10.0	18.4	18.0	25.5
Total Imports, Wheat and Coarse Grains	25.7	10.3	18.4	15.1	30.4	34.0	45.0
Percentage from U.S. Origin	54%	72%	78%	74%	50%	24%	37%
Soybean Imports:[c]							
U.S. Origin	0.31	0.91	0.85	1.18	0.81	.0	0.71
Non-U.S. Origin	1.37	0.55	0.06	0.59	0.28	1.2	1.29
Total	1.68	1.46	0.91	1.77	1.09	1.2	2.0
Percentage from U.S. Origin	18%	62%	93%	67%	74%	0.0	36%
Soybean Meal Imports:[c]							
U.S. Origin	0.0	0.08	0.0	0.05	0.0	0.0	0.0
Non-U.S. Origin	0.0	0.0	0.0	0.47	0.44	1.00	1.4
Total	0	0.08	0.0	0.52	0.44	1.00	1.4

[a]Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 23-82 (Washington, D.C.), July 16, 1982; *Foreign Agriculture Circular, Oilseeds and Products*, FOP 4-81 (Washington, D.C.), March 1981, and FOP 9-82 (Washington, D.C.), July 1982; U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Missouri), October 6, 1978, October 19, 1979 and October 3, 1980; U.S. Department of Agriculture, Agricultural Marketing Service, *Feed Market News* (Independence, Missouri), December 28, 1978, and December 3, 1980; U.S. Department of Agriculture, Foreign Agricultural Service, *U.S. Export Sales* (Washington, D.C.), June 4, 1982.

[b]July-June trade years.

[c]October-September marketing years.

the next nine years, Soviet imports fluctuated widely from year to year and accounted for 4 to 22 percent of global trade in wheat and coarse grains. Large year-to-year variations in Soviet crop production are a major reason for the fluctuation in its imports.

Table 25 shows U.S. and non-U.S. exports of grain, soybeans and soybean meal to the Soviet Union in the last seven years. The U.S. was the largest supplier of these products to Russia before the January 1980-July 1981 partial embargo on sales to the Soviet Union. The embargo did not halt the upward trend in Soviet grain purchases. However, it did bring a substantial shift in origins of Russian grain imports and in world trading patterns. The U.S. share of Soviet wheat and coarse grain imports dropped from 74 percent in 1978-79 to only 24 percent in 1980-81, but is expected to rise to approxmately 37 percent in the 1981-82 trade year. The U.S. share of Soviet soybean purchases declined from 74 percent in 1979-80 to zero the next year but recovered modestly in 1981-82.

Non-U.S. sources of Soviet imports since 1980-81 have included Western Europe, Thailand, Australia, Canada, Turkey, Brazil, India and Argentina, with the latter being the largest supplier. Increased Soviet purchases from these sources during and after the embargo reduced the amount of foreign grain available to other importing nations. As a result, the U.S. experienced temporarily larger exports to many non-Soviet destinations while the partial embargo was in effect. These trading patterns indicate the embargo (1) did not seriously restrict Soviet imports, as intended, and (2) probably reduced U.S. grain exports much less than generally believed—because of tighter non-U.S. grain supplies and a resulting temporary increase in trade with non-Soviet destinations.

Russia, in an effort to protect itself from future embargos, has negotiated sizeable longer-term grain agreements with Canada, Australia, Argentina and Brazil. With diversified sources of supply, the U.S. share of Soviet grain imports in the years ahead may remain below the peak level of the late 1970's. However, Russia likely will continue as a major market for U.S. grain and a modest outlet for U.S. soybeans. And despite more diversified purchases, the Soviet Union will remain a potentially important influence on U.S. and world grain prices in the 1980's.

Soviet Feeding Rates and Livestock Production

After rapid gains in the early 1970's, growth in Soviet production of meat and milk has slowed in recent years with three consecutive poor crops. Preliminary data indicate Russia's combined 1980 production of beef and veal, pork and poultry meat was equivalent to 58 percent of the U.S. production (See Table 26). With a population about one-fifth larger than the U.S., Soviet per capita meat supplies are well below those of the U.S. Total and per capita Soviet milk production, however, are much larger than in the U.S.

Data in Table 26 indicate Soviet utilization of grain in livestock feeding is relatively inefficient by U.S. standards and is less efficient now than a decade ago. For example, Russian farmers fed 88 percent as much grain as U.S. farmers in 1980 but produced only 58 percent as much beef, pork and poultry meat. During the last decade, Soviet meat output increased 26 percent along with a nine percent increase in milk production. To achieve these increases, Russian grain feeding rose by an estimated 58 percent.

One factor contributing to inefficient Soviet use of grain has been the low level of protein in Russian livestock and poultry rations. Soviet soybean meal feeding in 1970 was equivalent to only 2 percent of U.S. soybean meal feeding. By 1980, Soviet soybean meal feeding had risen to about one-tenth that of the U.S. In the 1980's, limited foreign exchange, inefficient use of grain and high costs of grain imports appear likely to encourage increased Soviet feeding of soybean meal and other protein ingredients. Higher protein levels in rations could permit increased livestock production with little increase in total utilization of grain.

Table 26. Selected Comparisons of U.S. and Soviet Livestock Production, Grain and Soybean Meal Feeding, 1970, 1975 and 1980.[a]

	Total Beef, Pork & Poultry Production			Total Milk Production			Grain Feeding			Soybean Meal Feeding		
	U.S.	USSR	USSR as % of U.S.	U.S.	USSR	USSR as % of U.S.	U.S.	USSR	USSR as % of U.S.	U.S.	USSR	USSR as % of U.S.
	(Mil. Metr. Tons)			(Mil. Metr. Tons)			(Mil. Metr. Tons)			(Mil. Metr. Tons)		
1970	21.4	11.0	51	53.1	83.2	157	134.0	78.0	58	12.3	0.3	2
1975	21.5	13.6	63	52.3	90.8	174	106.5	102.0	96	11.4	0.2	2
Preliminary 1980	24.1	13.9	58	57.8	91.0	157	139.4	123.0	88	17.4	1.8	10

[a]Source of data: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains, Oilseeds,* "Livestock and Poultry Feeding Industries in Selected Countries" GOL-1 (Washington, D.C.), October 1980. U.S. meat and milk production data are for calendar years while grain and soybean meal feeding data are for years beginning the previous October 1. Soviet meat, milk production and grain feeding data are for July-June years while soybean meal feeding is for September-August years.

Grain Imports by the People's Republic of China (PRC)

China ranks second after the Soviet Union as a closely watched indicator of world grain trade—although current record PRC grain imports are only about one-third as large as those of USSR. China's potential importance in world grain trade stems from two major features: (1) its centrally planned government and (2) its immense population of approximately one billion persons. With a centrally planned government, the element of potential surprise is ever-present in grain purchases. A PRC central purchasing agency could, if it so desired, contract the country's entire grain needs for a year or more into the future in a matter of weeks. In countries where trading is done by private enterprise, such purchases almost certainly would be spread over several months or longer—without the surprise element. With the PRC accounting for 23 percent of the world's population,[19] severe crop problems there or a government decision to increase per capita meat consumption could quickly bring sharply increased PRC grain and oilseed product imports.

Chinese grain import patterns since 1974-75 are shown in Table 27. PRC imports of wheat and coarse grains have varied from a low of 2.2 million metric tons in 1975-76 to a high of nearly 15 million tons in 1980-81, with the greatest variation being in wheat. The U.S. share of PRC wheat imports ranged from 0 to 33 percent from 1974 through the 1979-80 trade year, but increased to nearly two-thirds of all Chinese wheat imports after the U.S.-PRC Grain Trade Agreement was signed in 1980. This agreement runs through calendar year 1984 and commits the PRC to purchasing at least 6 million metric tons of U.S. wheat and corn per year, with purchases over 9 million tons requiring prior notification to the U.S. government. Corn purchases may account for 15 to 20 percent of the total annual purchases.[20] The agreement is expected to maintain the U.S. share of Chinese wheat imports at a high level at least through 1984.

Chinese coarse grain imports have ranged from zero to 3.1 million metric tons in the last eight trade years. At their record 1978-79 level, these imports were equivalent to only one-third of the Soviet Union's coarse grain imports and 17 percent of Japan's coarse grain imports.

Grain imports by the PRC in the decade ahead will depend on domestic grain production, availability of foreign exchange, relative priorities on agricultural versus industrial development and Chinese attitudes toward use of credit for grain purchases. The Chinese government has expressed interest in raising per capita consumption of livestock products, but long-range plans also call for a substantial increase in that country's grain production. In the past, China has been reluctant to buy grain on credit. However, longer-term financing may be available from the U.S. in the future if the PRC chooses to make grain purchases on credit. While these considerations make long-term PRC import prospects uncertain, China is expected to remain a sizeable importer of wheat and possibly an expanding market for U.S. corn in the years ahead.

Table 27. Grain Imports by the People's Republic of China by U.S. and Non-U.S. Origin, 1974-75 through 1981-82 in Millions of Metric Tons.[a]

	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	Est. 1981-82
Wheat Imports:								
U.S. Origin	1.5	0	0	0.3	2.6	2.1	8.5	8.0
Non-U.S. Origin	4.2	2.2	3.2	8.3	5.4	6.8	5.3	4.7
Total	5.7	2.2	3.2	8.6	8.0	8.9	13.8	12.7
Percentage from U.S. Origin	26	0	0	3	33	24	62	63
Coarse Grain Imports:								
U.S. Origin	0	0	0	0	2.8	1.9	0.8	[b]
Non-U.S. Origin	0.5	0	0	0.1	0.3	0.1	0.1	[b]
Total	0.5	0	0	0.1	3.1	2.0	0.9	1.2
Percentage from U.S. Origin	0	0	0	0	90	95	89	[b]
Percentage of Total Wheat & Coarse Grains from U.S.	24	0	0	3	49	37	63	[b]

[a]Compiled from data in U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 16-82 (Washington, D.C.), May 13, 1982; FG 5-81 (Washington, D.C.), January 28, 1981; and U.S. Department of Agriculture, Foreign Agricultural Service, *U.S. Export Sales* (Washington, D.C.), May 13, 1982. Data are for July-June trade years.

[b]Data on 1981-82 U.S. coarse grain exports to PRC for July-June trade year are not available at this writing.

Current Issues In World Food Trade

In one year's time, the global food situation has shifted from concern over scarcity and declining carryover stocks to concern over surplus supplies, an economic recession and much slower growth of trade than in previous years. The changing economic environment is bringing several disturbing trade policy developments to the forefront as exporting nations attempt to expand their shares of world markets and at the same time protect domestic producers from foreign competition. Two decades of trends in world food production and trade suggest the current supply-demand situation for agricultural products is likely to be a temporary one. For that reason, it is important not to lose sight of longer-term policy issues including world food security, investments in research and education to improve agricultural productivity, and financing of grain imports by developing nations. But in the current economic environment, four trade policy issues of more immediate concern are (1) a movement toward protectionism in world trade, (2) the use of long-term agreements in world grain trading (3) the use of food exports as a diplomatic tool and (4) economic policies needed for stable economic growth and expanding world trade.

Protectionism in Agricultural Trade

Potential advantages of free trade in agricultural and non-agricultural products are well-known, and for two decades world trade negotiations have been directed toward reducing trade barriers. However, many restrictions remain. From the U.S. perspective, major agricultural trade barriers include (1) the European Community's high internal prices for grain and variable import levies or taxes that are used to maintain EC prices above world levels[21] and (2) Japanese and European quotas and other restrictions on U.S. exports of livestock products. From the perspective of Europe and certain developing nations, the U.S. has a protectionist trade policy through quotas and other restrictions on imports of meat, dairy products and sugar. In an environment with little or no growth of world trade, trading partners are pressuring each other to eliminate such restrictions on agricultural and non-agricultural trade. In some cases, exporters are threatening to use export subsidies or subsidized credit to obtain larger market shares and/or counter protectionist practices of other exporting nations. The U.S. has threatened to use both approaches to offset EC grain export subsidies and incentives for expanded European production. The EC has threatened to restrict its imports of U.S. soybean products and protein by-product feeds from the U.S. fuel alcohol industry—in an effort to expand its use of domestically produced grain.

High EC support prices have generated wheat surpluses that must be subsidized heavily to be sold in world markets. The subsidies and growing EC production threaten the U.S. share of world wheat trade. With a 10 percent increase in EC farm price support levels in 1982,[22] additional EC subsidies likely will be needed in the future to maintain that area's share of world wheat trade. The EC has indicated it plans eventually to move its price support levels more into line with world markets. But support prices tend to be capitalized into land values; that and other political considerations make it difficult for the EC to lower its internal support prices. Consequently, there is some danger of a serious wheat trade war between the U.S. and EC. If a trade war is avoided, the EC might be forced to retain more of its wheat production for domestic livestock feeding. In the first case, there would be risk of sharply declining world wheat prices in the short run as both sides attempted to increase their shares of world trade. In the second case, U.S. wheat exports might increase at the expense of corn and soybean products as the EC used more domestic wheat and less U.S. corn and protein meal in livestock feeding. Longer-term results could be beneficial for U.S. and world trade provided the EC was at least persuaded to halt the rise in its grain price support levels.

U.S.-Japanese trade policy issues involve not only agricultural products but also Japan's large exports of non-farm products to the U.S. and its restrictions on imports of U.S. industrial goods. With U.S. pressure and threats of retaliatory actions on its industrial exports, Japan in mid-1982 agreed to reduce its import restrictions on 215 products, including U.S. processed pork, certain seafoods, some fruits and numerous non-agricultural products.[23] However, substantial Japanese import restrictions remain, including those on U.S. beef.

Increasing Use of Long-Term Grain Agreements

The U.S. nogotiated its first long-term grain agreement with the Soviet Union in 1976. Since then, such agreements have become increasingly widespread in international grain trading. The 1976 U.S.-USSR agreement provided for 6 to 8 million metric tons of U.S. grain to be sold annually to the USSR. Sales above this level required prior approval from the U.S. government. One purpose of the original agreement was to bring greater stability and predictability in Soviet grain purchases. Partly for the same reason, the U.S. has a similar agreement with the People's Republic of China and has had a short-term agreement with Mexico. The Soviet Union, probably to protect itself from future embargos and to diversify its sources of supply, now has similar agreements with Canada, Argentina, Brazil and several other nations. Formal long-term agreements with non-U.S. suppliers also cover grain sales to China, parts of North Africa and other developed and developing nations.

Long-term agreements bypass the market mechanism that discourages utilization when supplies are short and encourages increased usage when supplies are large. In that way such agreements reduce the need for recipient countries to adjust to year-to-year changes in world supplies. More of the adjusment is forced on exporting nations or other importers which do not rely on long-term agreements. In the years ahead, existing agreements and other pressures may force more importing nations to protect supplies through long-term commitments. Expanded use of such agreements could bring increased instability to livestock industries in grain exporting nations such as the U.S. and possibly to grain imports of developing countries. In effect, these nations would likely bear more of the burden of adjusting to a changing global supply situation.

Use of Food Trade as a Diplomatic Tool

Recent uses of food trade as a diplomatic tool include the partial U.S. embargo on grain sales to the USSR in 1980 and 1981, a U.S. embargo on exports to Iran in 1980 and West European restrictions on trade with Argentina in early 1982. Despite

evidence that such methods have not curtailed trade of the recipient nation, they continue to be used for diplomatic communication. Side effects include distorted market signals to grain and livestock producers in exporting nations and potentially increased costs to grain producers, handlers and governments of exporting nations. While extreme situations may justify trade restrictions, it appears desirable to avoid their use whenever possible. Relatively low global food reserves and uncertain future supplies create an environment in which agricultural trade may be used increasingly as a diplomatic tool in the years ahead. However, with a more secure world food situation, there would be less temptation to use food trade for diplomatic purposes.

Stable Economic Growth as a Requirement for Trade Expansion

Current slow growth in world trade, debt burdens of developing and centrally planned nations, high interest rates and threats of trade wars are related directly to general economic policies. A key element needed to encourage long-term expansion of world trade is a return to stable and sustainable growth of the world economy.

No consensus exists on policy actions needed to achieve this objective, but decision-makers should recognize that U.S. policies strongly influence the world economy. The linkage is through interest rates, flows of funds into or out of the U.S., changing currency exchange rates and U.S. demand for European and Asian industrial products. In the 1970's, expansionary U.S. monetary and fiscal policies brought low real interest rates, accelerated U.S. inflation, a declining U.S. dollar in world currency markets and growing U.S. demand for imported products. These same policies probably encouraged foreign nations to accumulate debts with the expectation of repaying them later with lower valued U.S. dollars.

In the early 1980's, U.S. monetary policy has become much more restrictive in an effort to slow inflation. U.S. real interest rates have moved to record high levels, attracting funds into the U.S. and forcing foreign nations to also follow restrictive monetary policies to prevent their currencies from weakening. In the decade ahead, trade will be encouraged if U.S. and foreign policy makers can arrive at a balanced package of monetary and fiscal policies to reduce inflationary pressures and encourage global investment and economic growth.

World Food Security

As noted earlier in this report, world grain stocks as a percentage of annual utilization are well below the levels of the late 1960's and early 1970's; current stocks are estimated at slightly less than two months' utilization. About half of the current world stocks are needed for normal feeding, merchandising and processing operations, so the net available reserve is slightly less than one-month's supply. Some analysts suggest a minimum safe level of world grain carryover stocks is 17 to 18 percent of annual utilization.[24] Projected 1982 world stocks, at approximately 15 percent of annual global consumption, fall slightly below this guideline.

Both importers and exporting nations have an important stake in maintaining reserves to offset fluctuations in world crop production. Without adequate reserves, agricultural trade will become increasingly subject to artificial trade restraints and manipulation for diplomatic purposes, as well as increased pressures for long-term grain agreements. Inadequate coarse grain reserves also would set the stage for substantial fluctuations in world livestock production as the means of adjusting to changing global grain supplies.

As pointed out in a previous section, much of the global grain reserve in the past two decades has been held in the U.S. Unresolved issues in world grain reserves include (1) the size of reserves needed, (2) where reserves should be stored, (3) methods of sharing costs for storing reserve grain, (4) prices or other conditions under which global stocks will be accumulated and released and (5) the impact on U.S. grain prices, grain producers and livestock feeders from storing global grain reserves in the U.S.[25]

Financing Agricultural Imports of Developing Nations

High interest rates, the long-term upward trend in world energy prices and large outstanding debts of some developing and centrally planned nations have become important restraints on future exports of U.S. farm products. These financial constraints are even beginning to affect a few petroleum exporting nations such as Nigeria, Mexico and Venezuela and have impacted severely on many non-petroleum exporting countries.[26]

Countries so affected likely will need several years of limited imports, along with efforts to improve domestic productivity and expand exports, in order to resolve current debt problems. In the meantime, the world community will face a substantial challenge in developing creative financing for food imports in the most severely indebted nations. In responding to the challenge, it will be important to strike a balance between providing food needs through imports and meeting needs through expanded domestic production.

Meeting Future Growth in World Demand for Farm Products

While current global grain supplies are adequate, it is important not to lose sight of the long-term upward trend in world population and dietary shifts toward increased consumption of livestock products. It will be increasingly costly and difficult to meet future demand growth through land clearing and expanded irrigation. For that reason, there is a continued need for investment in agricultural research and education to maintain the long-term upward trend in grain production and to encourage more efficient utilization of available feed ingredients. Areas continuing to offer substantial long-term returns include research on yield-increasing and cost-reducing technology for crop production, livestock and poultry production systems that use grain and protein meal more efficiently, techniques for economical control of soil erosion and more efficient use of available soil moisture, development of crop varieties with greater resistance to disease, drought and other climatic limitations and development of technology for reducing losses during harvesting, handling and storage. Agricultural research should be undertaken with the recognition that it is a long-term investment and that often a decade or more will be required before returns from such investments are realized. Investments made now will aid in meeting world food needs in the 1990's and beyond.

Notes

[1]See Robert N. Wisner and Massoud S. Denbaly, *World Food Trade and U.S. Agriculture, 1960-1980*, First Annual Edition, The World Food Institute, Iowa State University (Ames, Iowa), August 1981. Trends through 1981 for these same economic groupings are shown in Appendix I.

[2]For a listing of countries in these groupings, see Appendix I.

[3]For a detailed discussion of food production problems in this region, see U.S. Department of Agriculture, Economic Research Service, *Problems and Prospects in Sub-Saharan Africa*, Foreign Agricultural Economic Report No. 166 (Washington, D.C.), 1981.

[4]Food and Agriculture Organization of the United Nations, *Commodity Review and Outlook 1980-81*, No. 20 (Rome, Italy), 1980.

[5]Food and Agriculture Organization of the United Nations, *Food Outlook*, No. 3, 1982 (Rome, Italy), March 23, 1982, p. 12.

[6]For a discussion of U.S. and world economic prospects, see "International Economic Situation," *Review of International Trade and Development* (Hamburg, Germany), November/December 1981, pp. 303-304; Gunter Grober, Gunter Weinert, "World Economic Trend Still Weak," *Review of International Trade and Development* (Hamburg, Germany), January/February 1982, pp. 49-52; and L. R. Klein, et. al., "Econometric Forecast for the United States, 1981.4-1984.3," *The Wharton Magazine Economic Newsletter*, Vol. 6, No. 2, University of Pennsylvania (Philadelphia, Pa.), Winter 1981-82, pp. 57-61.

[7]For a discussion of MCA's and their effects on EC grain prices, see Cathy L. Jabara, "Effect of Monetary Compensatory Amounts in Determining Rates of Protection From EC Grain Import Levies," *Canadian Journal of Agricultural Economics*, February 1981, 29 (1), pp. 63-70, and Dan Conable, "EC Agrimonetary System Under New EMS," *Foreign Agriculture*, U.S. Department of Agriculture, Foreign Agricultural Service (Washington, D.C.), May 1979, pp. 12-13.

[8]Based on "Debt Rescheduling 'Set' For Romania by June," *Journal of Commerce* (New York, N.Y.), April 29, 1982, p. 1.

[9]"Yugoslavia's Lenders Apprehensive," *Wall Street Journal*, Midwest Edition (Des Moines, Iowa), May 7, 1982, p. 23.

[10]For example, see "Mexico, Venezuela Lead Credit Push," *Journal of Commerce* (New York, N.Y.), May 14, 1982, p. 6A, which indicates Mexico's international debt is approaching $60 billion.

[11]"Mexico Puts Ban on Non-Essential Imports," *Journal of Commerce* (New York, N.Y.), May 1982, p. 3A.

[12]U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Trade of the United States* (Washington, D.C.), November/December 1981. p.3.

[13]U.S. Department of Agriculture, Economic Research Service, *Agricultural Outlook* (Washington, D.C.), March 1982.

[14]Based on data from U.S. Department of Agriculture, Economic Research Service, *Agricultural Outlook* (Washington, D.C.), April and May 1982.

[15]U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Trade of the United States, Op. Cit.* p. 3.

[16]U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business* (Washington, D.C.), Vol. 62, No. 3, March 1982, p. 3.

[17]Susan A. Libbin, "Review of Public Law 480 and Other U.S. Food Aid Programs, Fiscal Years 1955-79" in U.S. Department of Agriculture, Economics and Statistics Service, *Foreign Agricultural Trade of the U.S.* (Washington, D.C.), November/December 1980, pp. 79-102.

[18]For further discussion of the principle of comparative advantage, see J. P. Houck and P. K. Pollak, "Basic Concepts of Trade" in *Speaking of Trade, Its Effect on Agriculture*, Minnesota Extension Service, University of Minnesota (St. Paul, Minn.), Special Report No. 72, November 1978, pp. 21-35.

[19]U.S. Department of Commerce, Bureau of Census, International Population Dynamics, 1950-80, *Demographic Estimates for Countries with a Population of 5 Million or More* (Washington, D.C.), 1981, pp. 70-90.

[20]U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular, Grains*, FG 5-81 (Washington, D.C.), January 28, 1981.

[21]For a discussion of EC grain price support policies and their effects on production and trade, see U.S. Department of Agriculture, Foreign Agricultural Service, "European Community Grain Policies and Developments," *Foreign Agriculture Circular, Grains*, FG 42-81 (Washington, D.C.), December 11, 1981.

[22]*Reuter News Wire Service* (London, England), May 10, 1982 and June 1, 1982.

[23]*Reuter News Wire Service* (London, England), May 27, 1982.

[24]For a discussion of grain carryover stocks and other key indicators as measures of world food security, see Munich-Weihenstephan "Objective Indicators of Large Scale Food Shortages?," *Review of International Trade and Development* (Hamburg, Germany), July/August 1981, pp. 178-182.

[25]Issues related to grain reserves are discussed in J. A. Sharples, *An Evaluation of U.S. Grain Reserve Policy, 1977-80*, U.S. Department of Agriculture, Economic Research Service, Agricultural Economic Report No. 481 (Washington, D.C.), March 1982; Organization For Economic Cooperation and Development, *The Instability of Agricultural Commodity Markets* (Paris, France), 1980; P. H. Trezise, *Rebuilding Grain Reserves*, The Brookings Institution (Washington, D.C.), 1976; and K. C. Knapp, "Optimal Grain Carryovers in Open Economies: A Graphical Analysis," *American Journal of Agricultural Economics*, Vol. 64, No. 2, May 1982, pp. 197-204.

[26]For a discussion of financial obligations of individual developing nations, see U.S. Department of Agriculture, Economic Research Service, *World Food Aid Needs and Availabilities, 1982* (Washington, D.C.), April 1982.

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Appendix I: Food Production and Population Trends by Economic and Geographic Classifications of Countries

Classification of Countries by Economic Category

Developed Market Economics
1. Australia
2. Austria
3. Canada
4. Denmark
5. Finland
6. West Germany
7. France
8. Iceland
9. Ireland
10. Italy
11. Japan
12. Luxembourg and Belgium
13. The Netherlands
14. Norway
15. Sweden
16. Switzerland
17. United Kingdom
18. United States

Centrally Planned Economies
1. Albania
2. Angola
3. Buhtan
4. Bulgaria
5. China
6. Cuba
7. Czechoslovakia
8. East Germany
9. Hungary
10. Khmer
11. Korea (North)
12. Laos
13. Mongolia
14. Mozambique
15. Poland
16. Romania
17. South Yemen
18. USSR
19. Vietnam
20. Yugoslavia

Rapidly and Moderately Developing Nations
1. Algeria
2. Argentina
3. Bolivia
4. Brazil
5. Cameroun
6. Chile
7. Colombia
8. Congo
9. Costa Rica
10. Cyprus
11. Dominican Republic
12. Ecuador
13. Egypt
14. El Salvador
15. Ghana
16. Greece
17. Guatemala
18. Honduras
19. India
20. Indonesia
21. Iran
22. Iraq
23. Israel
24. Ivory Coast
25. Jamaica
26. Jordan
27. Korea (South)
28. Kuwait
29. Lebanon
30. Liberia
31. Libya
32. Malaysia
33. Mexico
34. Morocco
35. New Zealand
36. Nicaragua
37. Nigeria
38. Pakistan
39. Panama
40. Papua New Guinea
41. Paraguay
42. Peru
43. Philippines
44. Portugal
45. Puerto Rico
46. Saudi Arabia
47. Senegal
48. Singapore
49. South Africa
50. Spain
51. Syria
52. Taiwan
53. Thailand
54. Trinidad
55. Tunisia
56. Turkey
57. Uruguay
58. Venezuela
59. North Yemen
60. Zambia
61. Zimbabwe

Other Developing Nations
1. Afghanistan
2. Bahamas
3. Bahrain
4. Bangladesh
5. Barbados
6. Botswana
7. Burma
8. Burundi
9. Central African Republic
10. Chad
11. Comoros
12. Cape Verde
13. Djibouti
14. Dominica
15. Dahomey
16. Ethiopia
17. Equatorial Guinea
18. Fiji
19. Gabon
20. The Gambia
21. Grenada
22. Guinea
23. Guinea Bissau
24. Guyana
25. Haiti
26. Kenya
27. Lesotho
28. Madagascar
29. Malawi
30. Maldives
31. Mali
32. Malta
33. Mauritania
34. Mauritius
35. Nepal
36. Niger
37. Oman
39. Qatar
39. Rwanda
40. St. Lucia
41. Sao Tome Principe
42. Seychelles
43. Sierra Leone
44. Solomon
45. Somalia
46. Sri Lanka
47. Sudan
48. Surinam
49. Swaziland
50. Tanzania
51. Togo
52. Uganda
53. United Arab Emirates
54. Upper Volta
55. Western Samoa
56. Zaire

Classification of Countries by Geographic Location

North Africa
Algeria
Chad
Egypt
Ethiopia
Libya
Mali
Mauritania
Morocco
Niger
Sudan
Tunisia

Southern Africa
South Africa
Southwest Africa
Zimbabwe

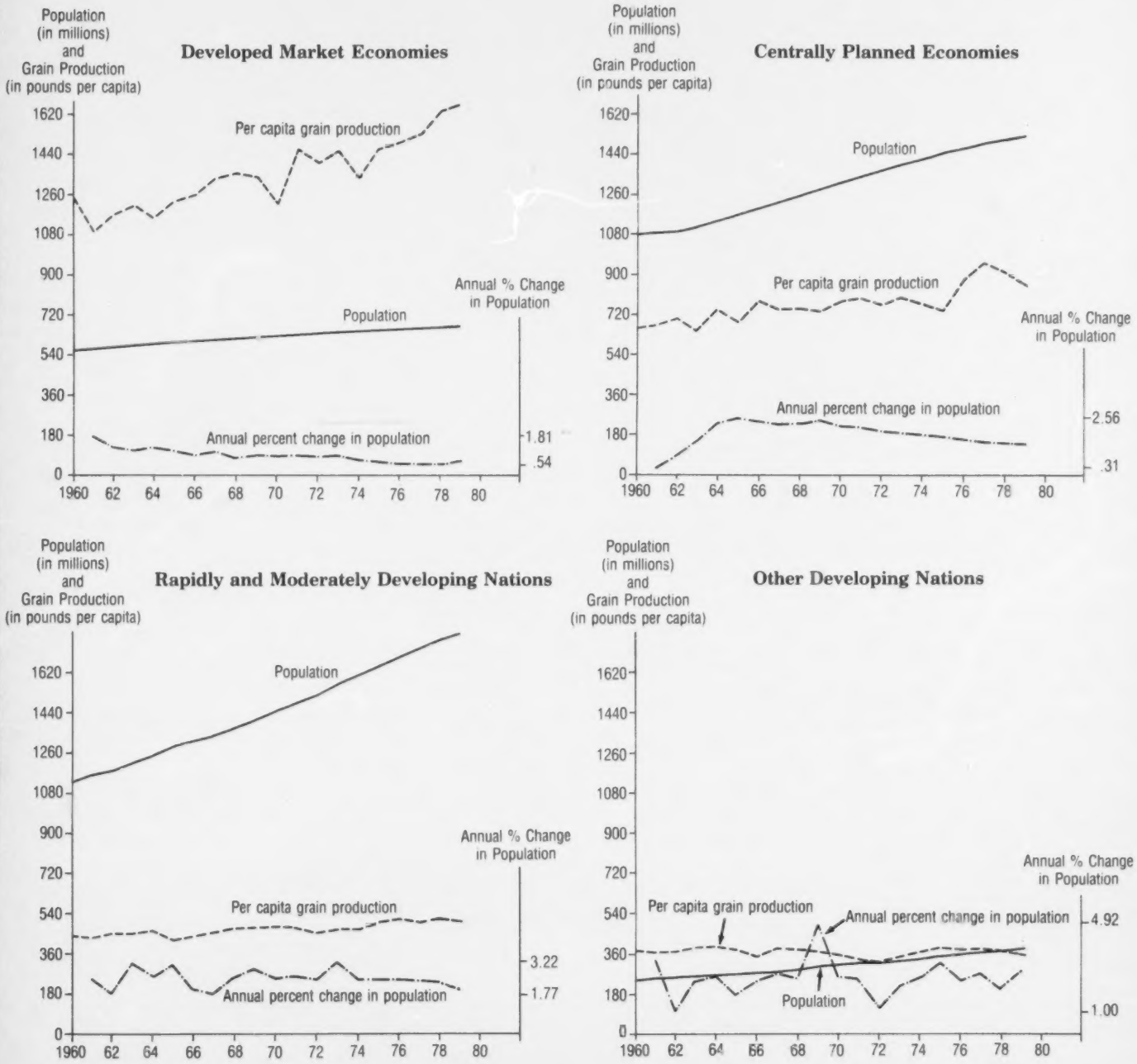
Sub-Saharan Africa
Angola
Benin
Botswana
Burundi
Cameroun
Cape Verde
Central African Republic
Comoros
Congo
Djibouti
Gabon
Gambia
Ghana
Guinea
Guinea Bissau
Ivory Coast
Kenya
Lesotho
Liberia
Madagascar
Malawi
Mauritius
Mozambique
Nambia
Nigeria
Reunion
Rwanda
Senegal
Sierra Leone
Somalia
Swaziland
Uganda
Upper Volta
Tanzania
Zaire
Zambia
Zanzibar

Indian Subcontinent
Afghanistan
Bangladesh
Burma
India
Nepal
Pakistan
Sri Lanka
Thailand

Central America
Antigua
Bahamas
Barbados
Bermuda
British Honduras
Costa Rica
Cuba
Dominican Republic
El Salvador
Grenada
Guatemala
Guadeloupe
Haiti
Honduras
Jamaica
Martinique
Montserrat
Netherlands Antilles
Nicaragua
Panama
Puerto Rico
Trinidad and Tobago
United States Virgin Islands

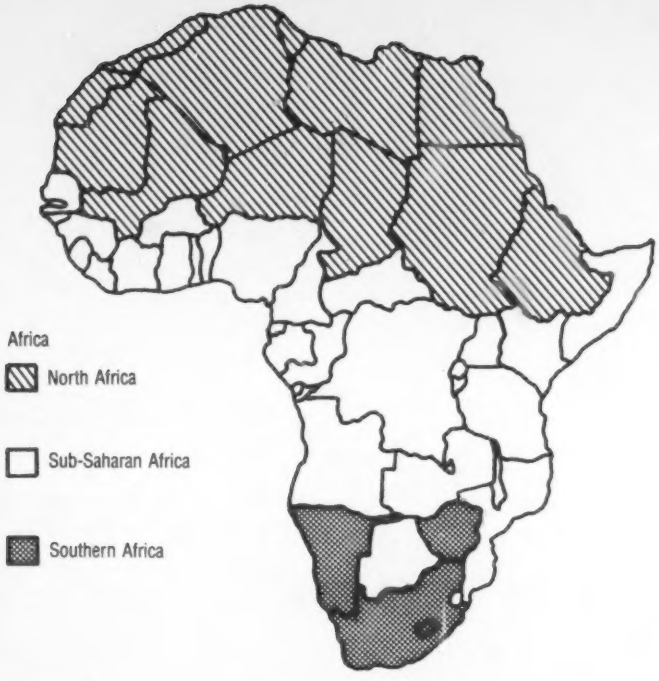
South America
Argentina
Bolivia
Brazil
Chile
Columbia
Ecuador
French Guiana
Guyana
Paraguay
Peru
Surinam
Uruguay
Venezuela

Others
Mexico

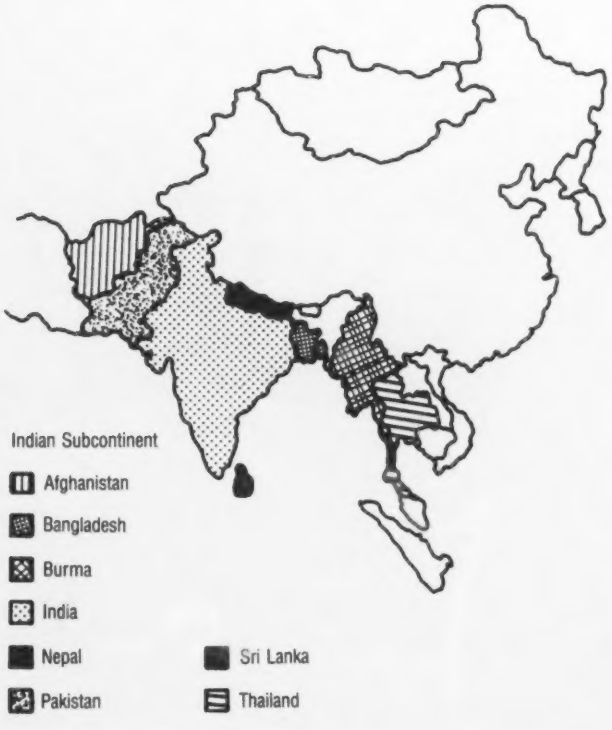


Appendix I, Figure 1. Trends in Population, Population Growth Rates and Per Capita Grain Production by Economic Groupings of Nations, 1960-1979.

Note: Unusual yearly fluctuations in the population growth rates are due to data limitations in population series for developing nations.

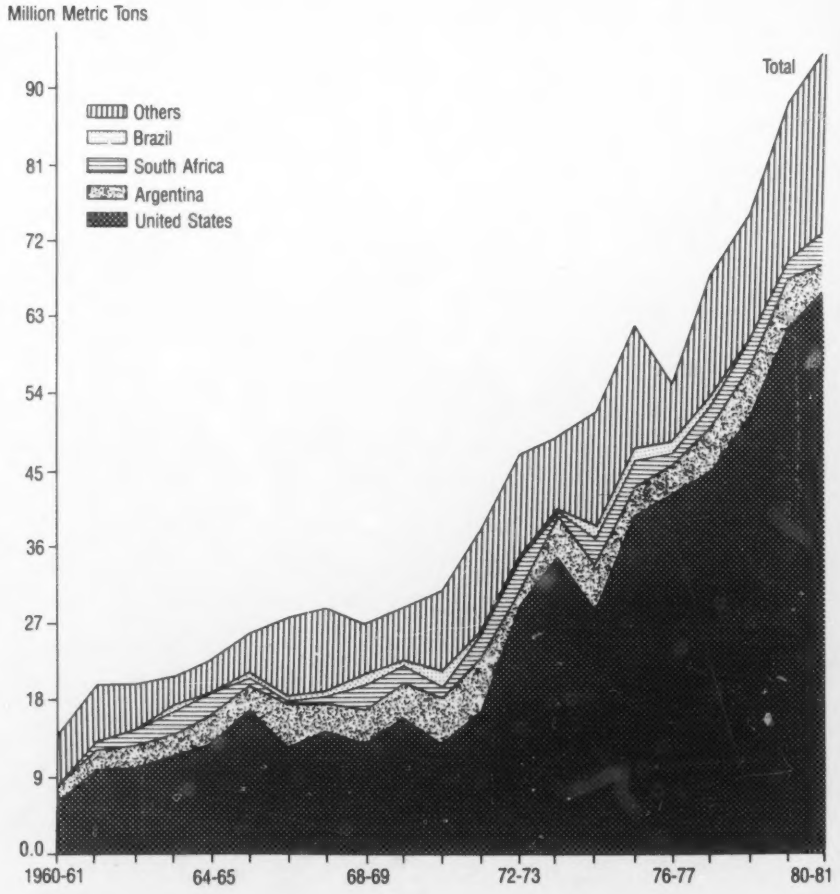


Appendix I, Map 1. Geographic Divisions for Africa.



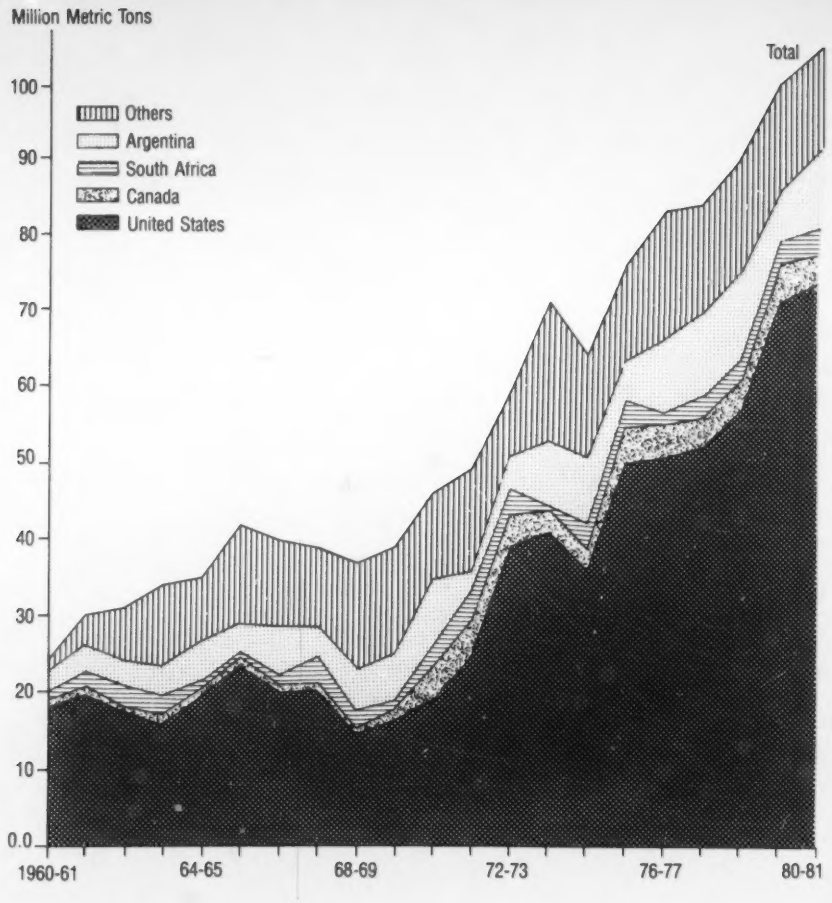
Appendix I, Map 2. Countries in the Indian Subcontinent.

Appendix II: World Grain, Soybean and Soybean Product Exports by Country of Origin, 1960-1980



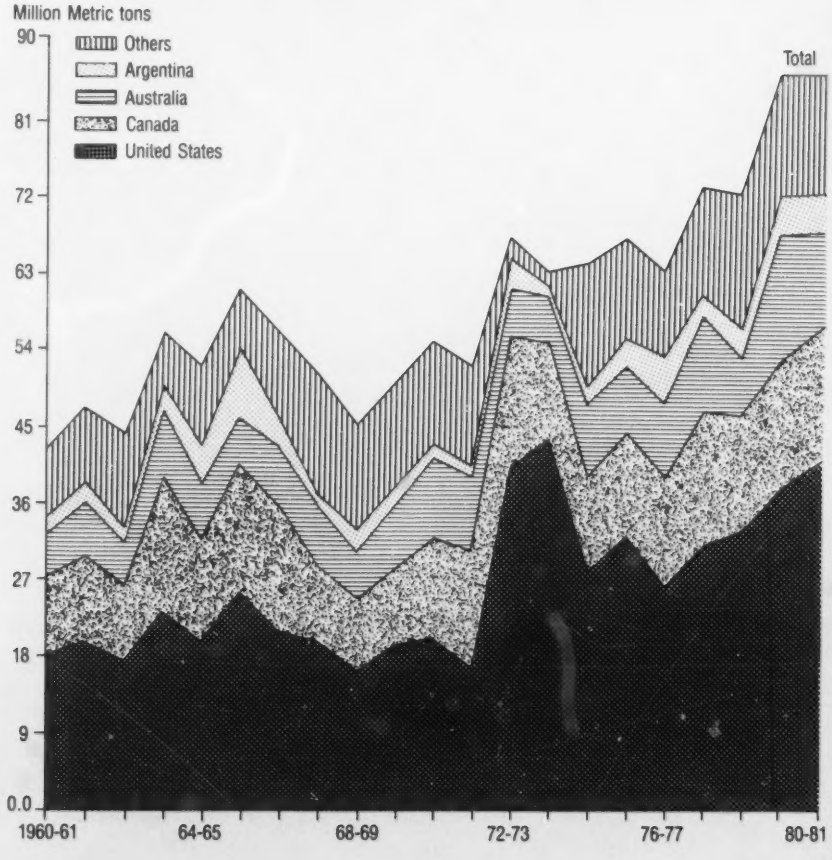
Appendix II, Figure 1. World Corn Exports by Country of Origin, June-May, 1960-61 to 1980-81.

Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues, (Rome, Italy).



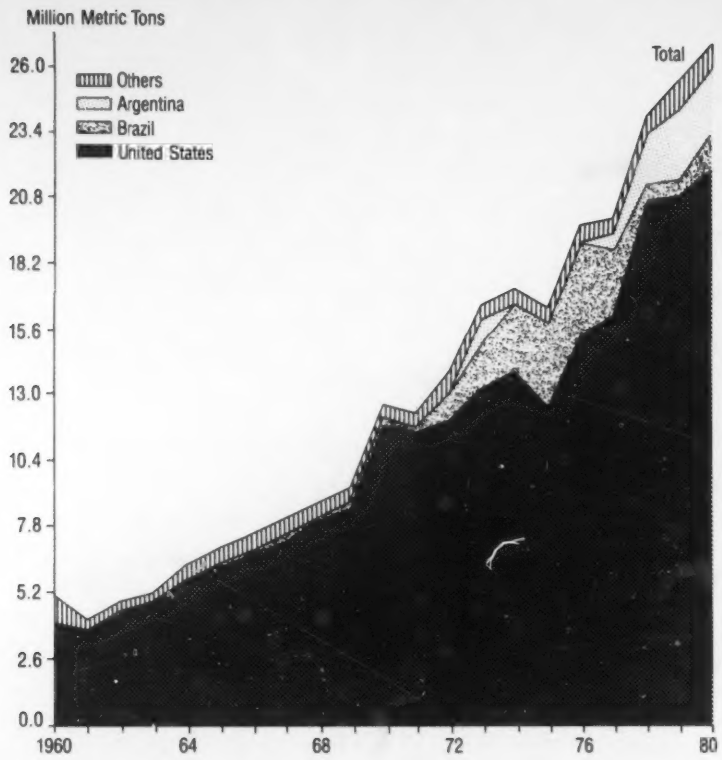
Appendix II, Figure 2. World Coarse Grain Exports by Country of Origin, June-May, 1960-61 to 1980-81.

Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).



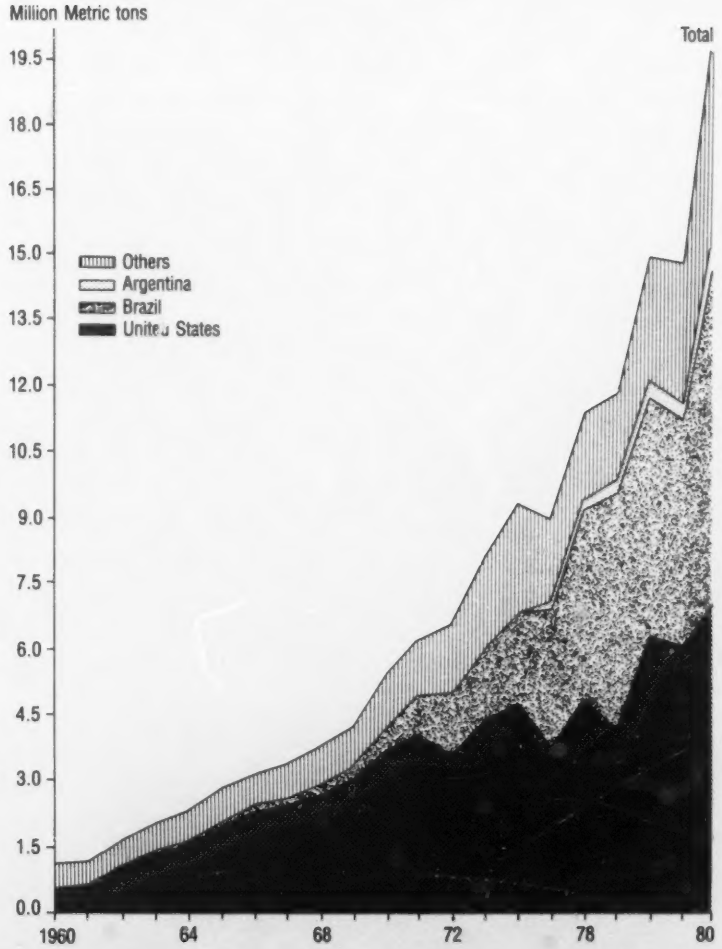
Appendix II, Figure 3. World Wheat Exports by Country of Origin, June-May, 1960-61 to 1980-81.

Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).



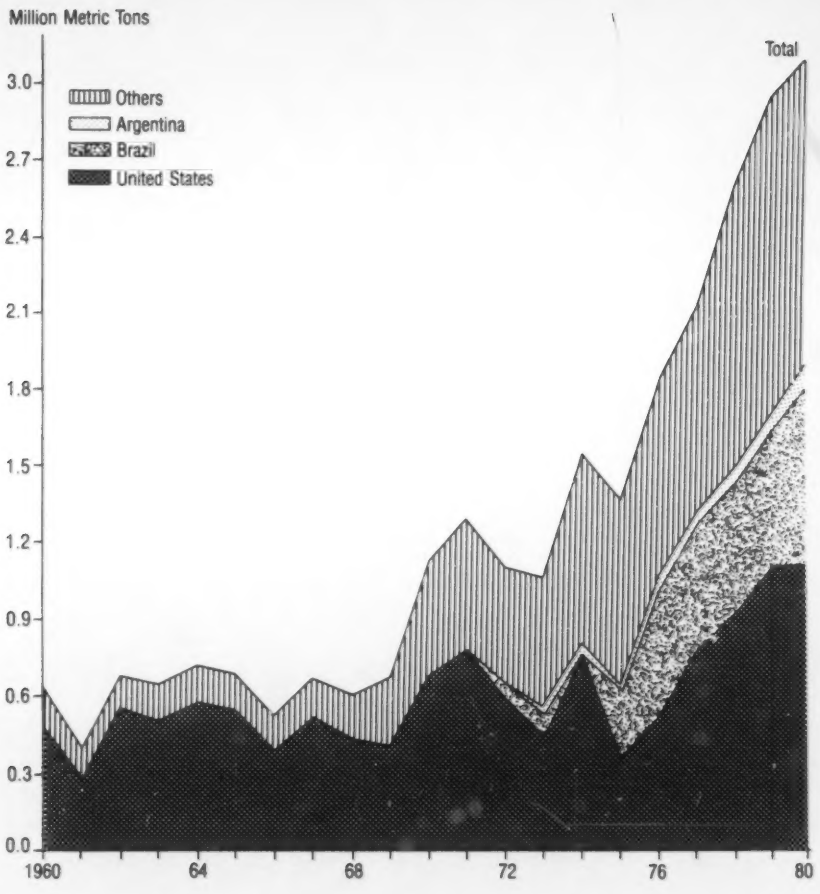
Appendix II, Figure 4. World Soybean Exports by Country of Origin, Calendar Years 1960 to 1980.

Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues (Rome, Italy).



Appendix II, Figure 5. World Soybean Meal Exports by Country of Origin, Calendar Years 1960 to 1980.

Source: Food and Agriculture Organization of the United Nations, *Production Yearbook*, Various Issues, (Rome, Italy).



Appendix II, Figure 6. World Soybean Oil Exports by Country of Origin, Calendar Years 1960 to 1980.

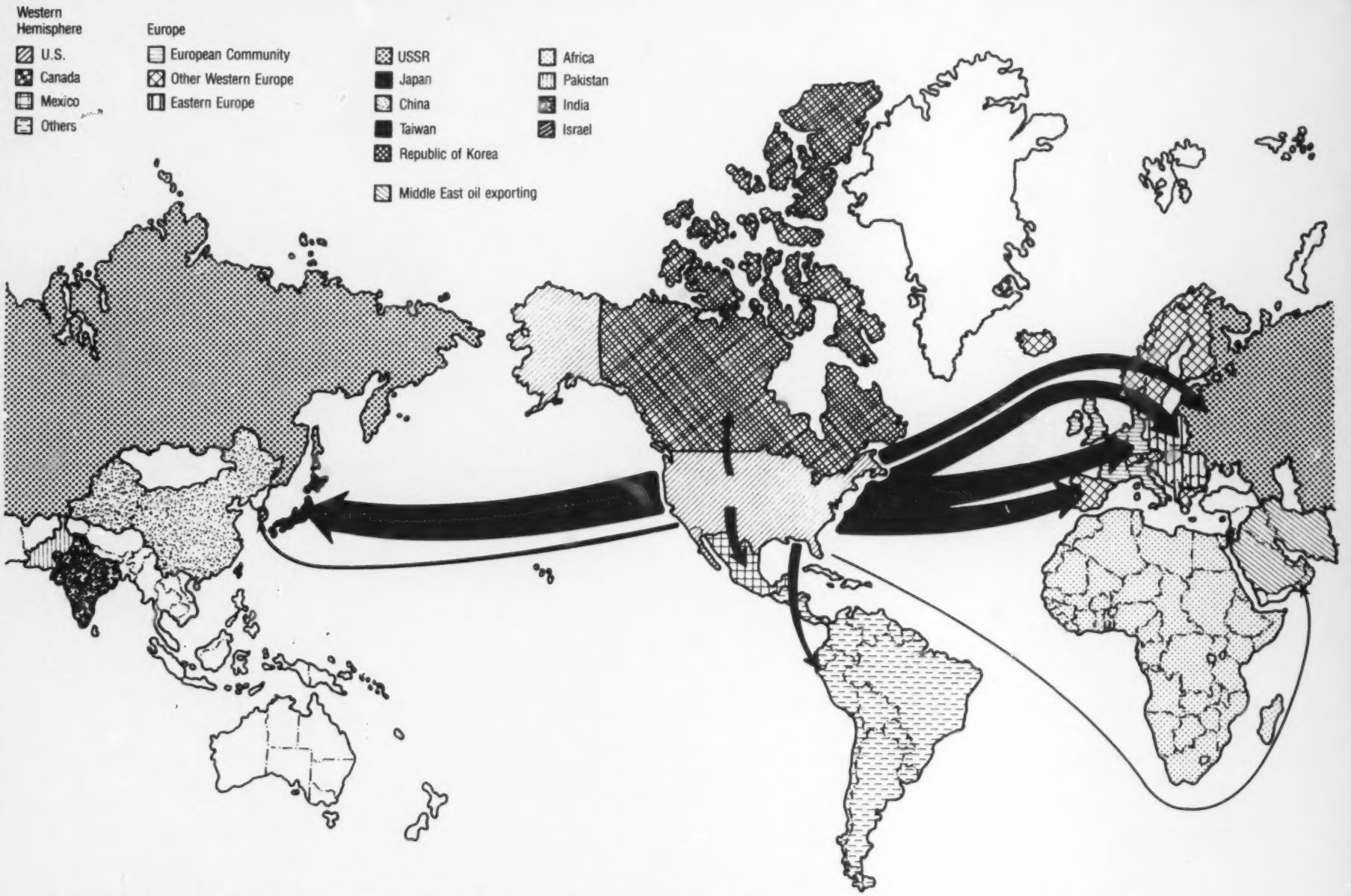
Source: Food and Agriculture Organization of the United Nations. *Production Yearbook*, Various Issues (Rome, Italy).

Appendix III: Maps and Tables Showing Destinations and Ports of U.S. Grain, Soybean and Soybean Product Exports in 1980-81

Appendix III, Table i. U.S. Corn Exports in Thousands of Metric Tons by Port Areas and Major Destinations, October-September 1980-81.

Destination	Saint Lawrence Seaway & Lakes	Atlantic	Gulf	Pacific	Interior	Total
Canada	2,917.35	0	0	0	10.21	2,927.56
Mexico	0	0	1,592.10	702.50	1,317.41	3,612.01
Other Western Hemisphere	0	215.73	3,351.97	0	0	3,567.70
European Community	665.99	1,897.62	7,414.96	0	0	9.978.57
Other Western Europe	973.91	2,398.58	3,717.64	0	0	7,090.13
Eastern Europe	324.58	2,472.45	3,423.24	0	0	6,220.27
Middle East Oil Exporting Countries	24.99	12.19	83.65	0	0	120.83
Japan	0	25.32	6,916.97	5,614.04	0	12,566.33
Republic of Korea	0	0	1,162.84	1,170.87	0	2,333.71
USSR	200.24	146.16	4,373.93	0	0	4,720.33
Others	54.26	1,200.22	3,601.77	1,211.00	0	6,067.25
Total	5,161.32	8,368.27	35,639.07	8,708.21	1,327.62	59,204.49

Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Mo.), various issues, and U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circulars* (Washington, D.C.), various issues.

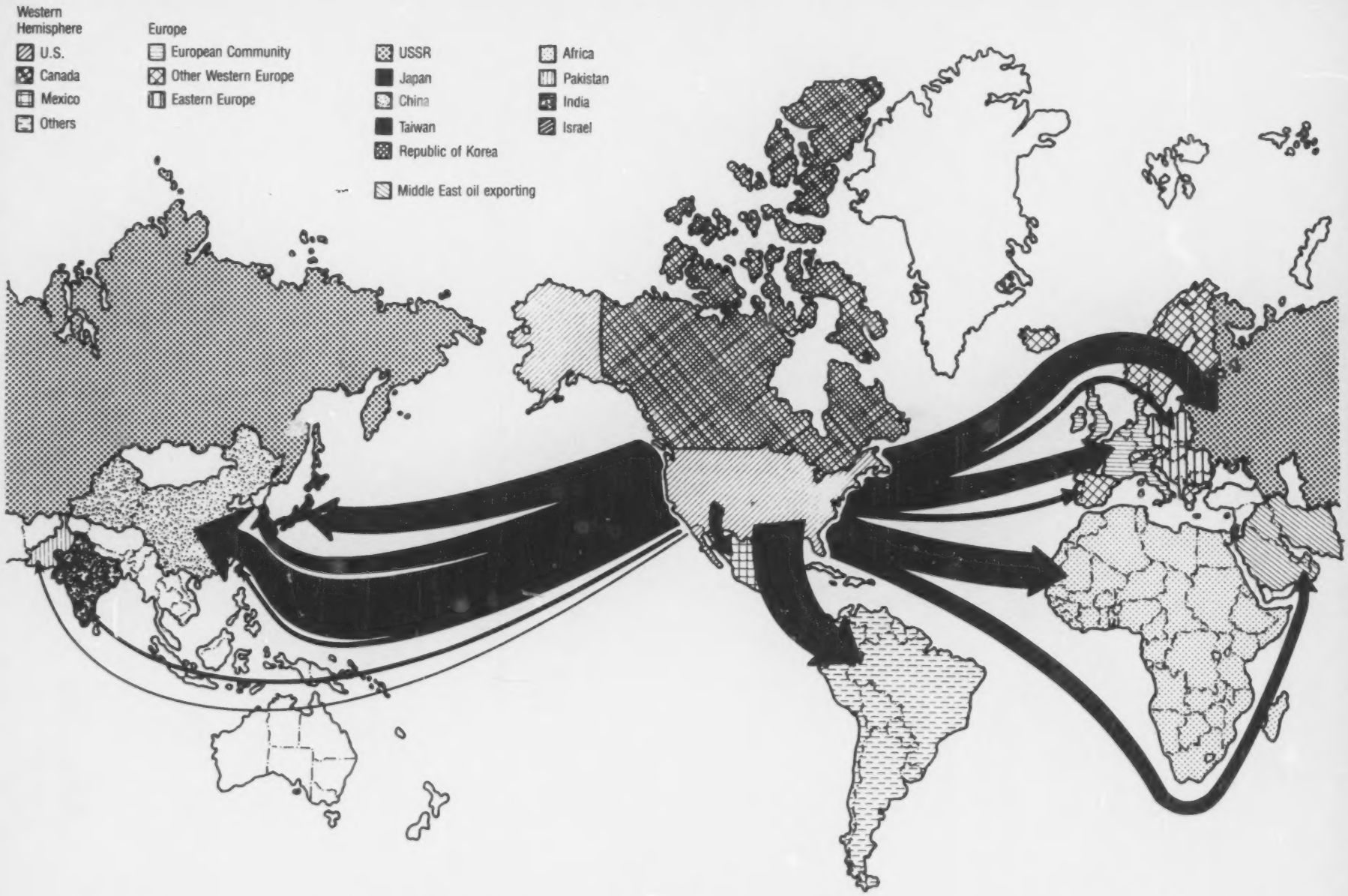


Appendix III. Map 1. Flow Pattern of U.S. Corn Exports to Major Foreign Destinations in 1980-81.

Appendix III, Table 2. U.S. Wheat Exports in Thousands of Metric Tons by Port Areas and Major Destinations, October-September 1980-81.

Destination	Saint Lawrence Seaway & Lakes	Atlantic	Gulf	Pacific	Interior	Total
Mexico	0	0	652.68	0	566.65	1,219.34
Other Western Hemisphere	243.33	0	6,320.81	768.13	0	7,332.28
European Community	1,526.17	74.27	1,610.64	229.02	0	3,440.10
Other Western Europe	83.93	209.64	412.02	49.72	0	755.31
Eastern Europe	55.85	121.49	612.21	158.28	0	947.78
Middle East Oil Exporting Countries	27.49	271.39	311.07	731.01	0	1,340.96
Pakistan	0	0	65.40	84.53	0	149.93
India	0	0	222.27	318.07	0	540.34
USSR	0	0	3,548.15	112.21	0	3,660.36
Japan	0	0	483.51	3,064.93	0	3,548.45
China	322.37	1,453.28	5,006.52	1,220.15	0	8,002.32
Taiwan	0	0	0	609.95	0	609.95
Republic of Korea	0	0	0	2,054.96	0	2,054.96
Africa	400.72	293.79	2,544.55	2,166.96	0	5,406.02
Other	11.46	163.57	320.95	2,364.70	0	2,860.68
Total	2,671.32	2,587.44	22,110.78	13,932.59	566.65	41,868.78

Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Mo.), various issues, and U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circulars* (Washington, D.C.), various issues.

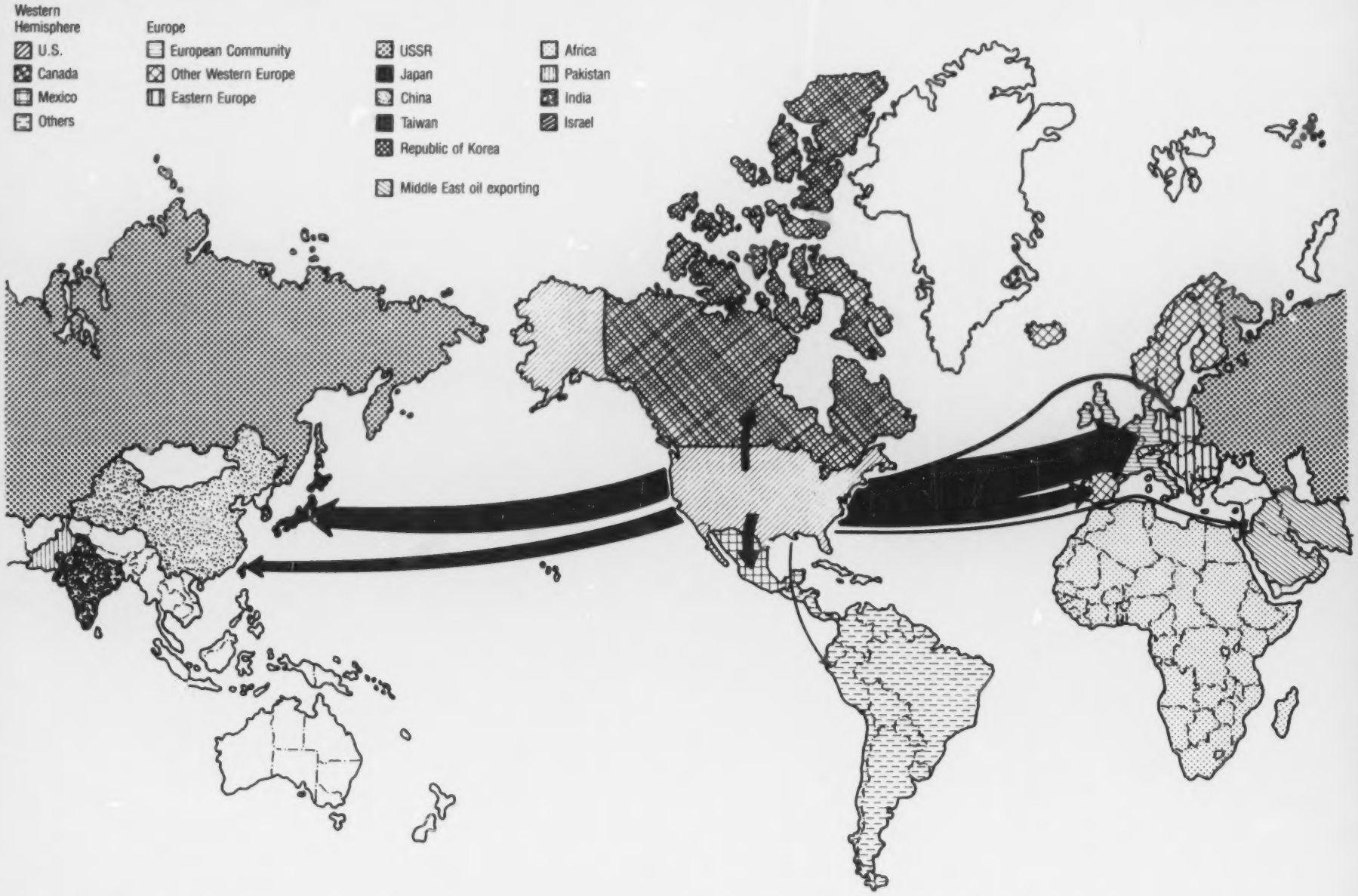


Appendix III. Map 2. Flow Pattern of U.S. Wheat Exports to Major Foreign Destinations in 1980-81.

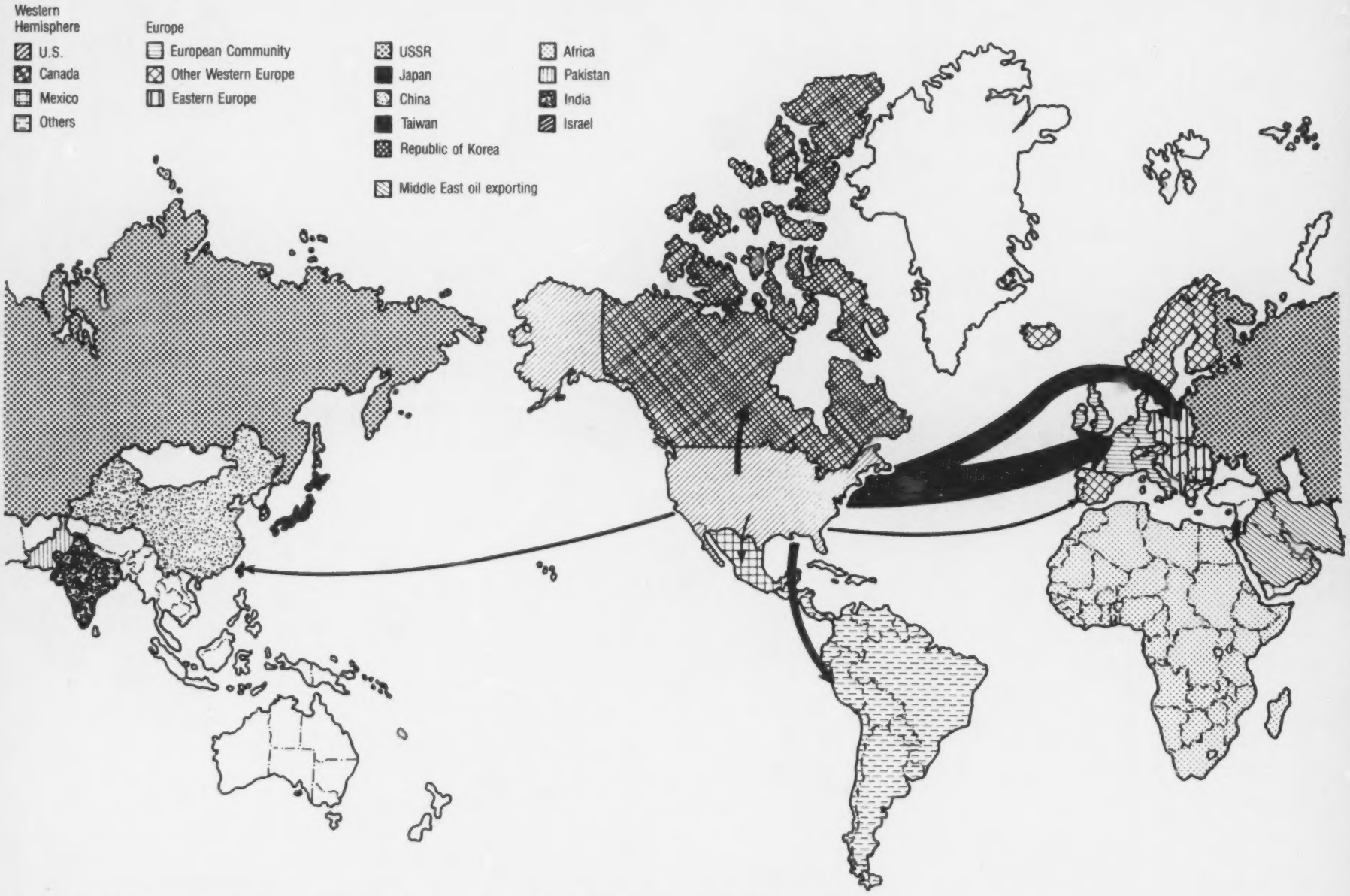
Appendix III, Table 3. U.S. Soybean Exports in Thousands of Metric Tons by Port Areas and Major Destinations, October-September 1980-81.

Destinations	Saint Lawrence Seaway & Lakes	Atlantic	Gulf	Pacific	Interior	Total
Canada	706.00	0	0	0	.57	706.57
Mexico	0	0	484.00	0	316.76	800.76
Other Western Hemisphere	0	0	273.49	0	0	273.49
European Community	272.81	355.22	7,611.59	0	0	8,239.62
Other Western Europe	382.90	418.74	1,269.14	0	0	2,070.78
Eastern Europe	94.08	215.27	350.45	0	0	659.80
Taiwan	0	77.24	927.64	0	0	1,004.88
Israel	60.39	187.03	88.67	0	0	336.09
Japan	207.57	439.80	3,120.05	23.21	0	3,790.63
Others	49.42	230.40	1,087.75	0	0	1,367.57
Total	1,773.17	1,923.70	15,212.78	23.21	317.33	19,250.19

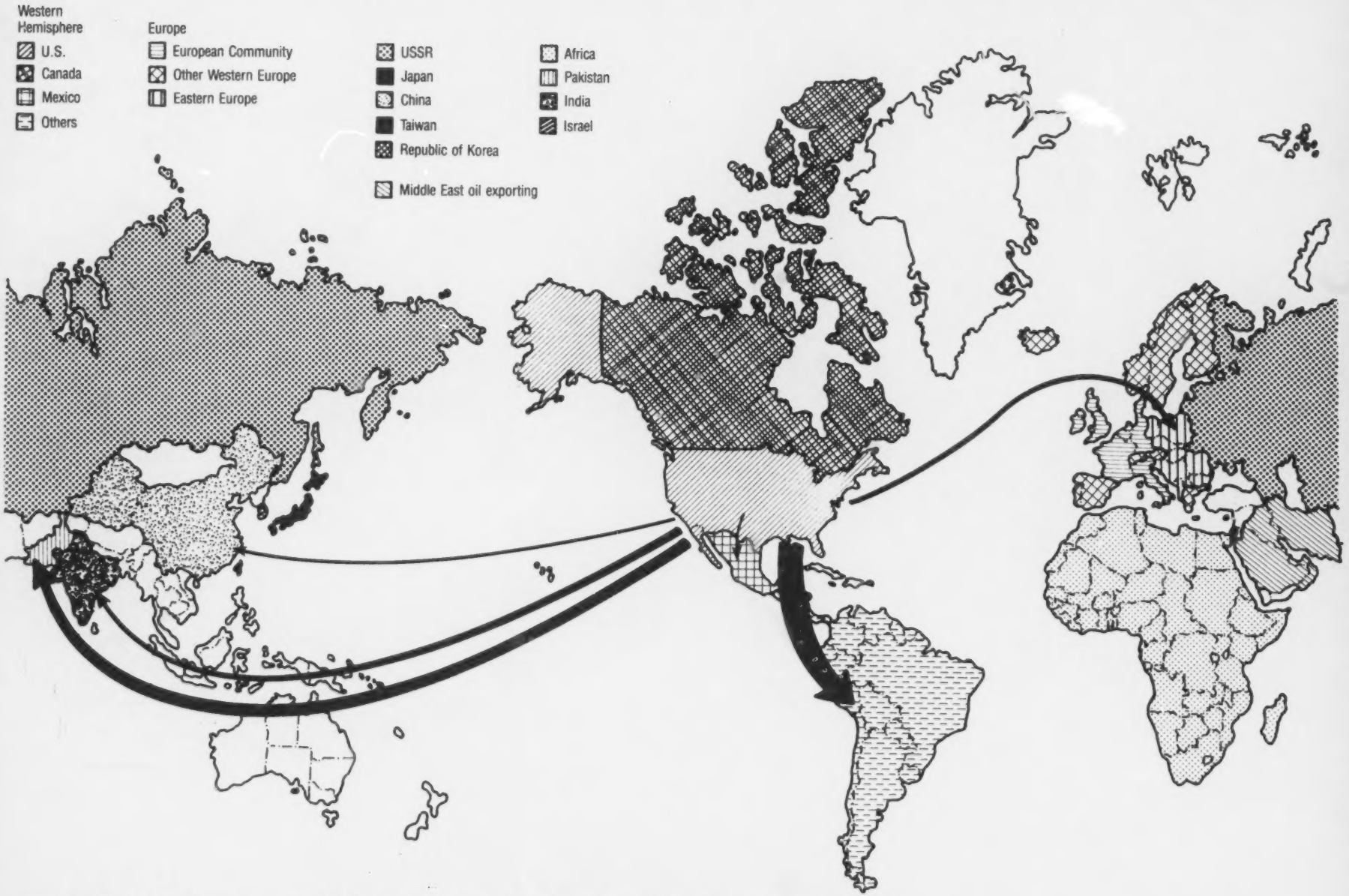
Sources: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain Market News* (Independence, Mo.), various issues, and U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circulars* (Washington, D.C.), various issues.



Appendix III. Map 3. Flow Pattern of U.S. Soybean Exports to Major Foreign Destinations in 1980-81.



Appendix III. Map 4. Flow Pattern of U.S. Soybean Meal Exports to Major Foreign Destinations in 1980-81.



Appendix III. Map 5. Flow Pattern of U.S. Scybean Oil Exports to Major Foreign Destinations in 1980-81.